Report 11183
July 1998

Integrated Advanced Microwave Sounding Unit-A (AMSU-A)

Performance Verification Report

Subassembly and Complete Instrument Assembly

EOS AMSU-A1 Antenna Drive Subassembly,

P/N 1356008-1, S/N 202

Contract No. NAS 5-32314
CDRL 208

Submitted to:

National Aeronautics and Space Administration
Goddard Space Flight Center
Greenbelt, Maryland 20771

Submitted by:

Aerojet
1100 West Hollyvale Street
Azusa, California 91702

Report 11183
July 1998

AMSU-A VERIFICATION TEST REPORT

TEST ITEM:	AMSU- A1 ANTENNA DRIVE SUBSYSTEM PART OF P/N: 1356008-1 SERIAL NUMBER : 202
LEVEL OF ASSEMBLY:	SUBASSEMBLY AND COMPLETE INSTRUMENT ASSEMBLY
TYPE HARDWARE:	FLIGHT
VERIFICATION: PROCEDURE NO.	AE-26002/1C

TEST DATE:

SUBSYSTEM:	START DATE:	18 December 1997
	FINISH DATE:	10 April 1998

TABLE OF CONTENTS

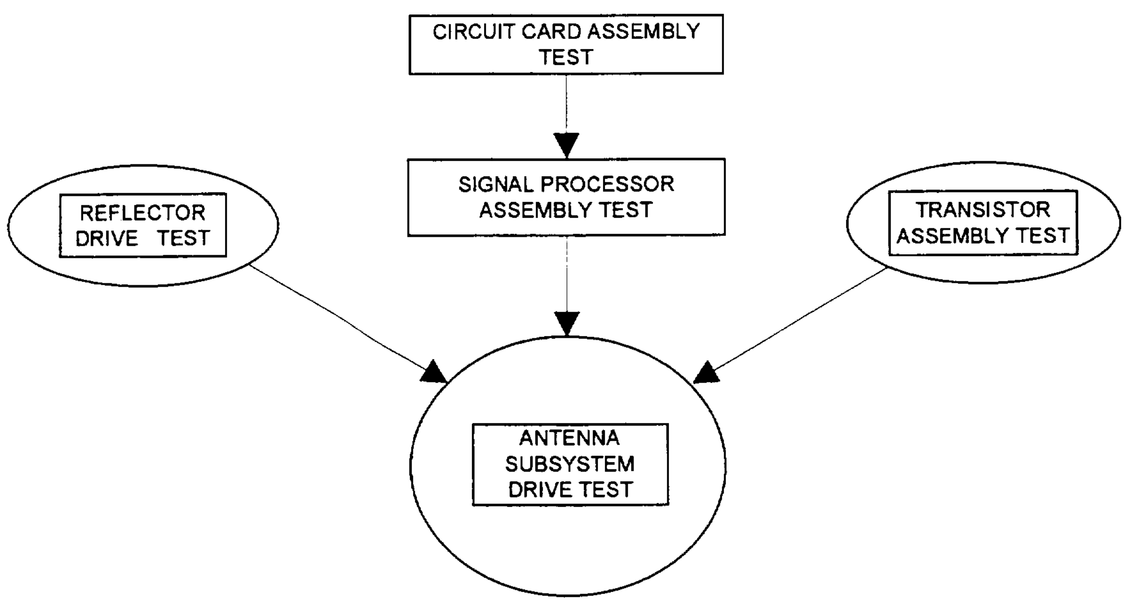
1.0 INTRODUCTION

An antenna drive subsystem test was performed on the EOS AMSU-A1, S/N 202 instrument. The objective of the test was to demonstrate compliance with applicable paragraphs of AMSU-A specifications S-480-80. Tests were conducted at both the subassembly and instrument level.

2.0 SUMMARY

The antenna drive subsystem of the EOS AMSU-A1, S/N 202, P/N 1356008-1, completed acceptance testing per AES Test Procedure AE-26002/1C. The test included: Scan Motion and Jitter, Noisy Bus Peak Current and Rise Time, Resolver Reading and Position Error, Gain/ Phase Margin, and Operational Gain Margin.

The drive motors and electronic circuitry were also tested at the component level. The drive motor test includes: Starting Torque Test, Motor Commutation Test, Resolver Operation/ No-Load Speed Test, and Random Vibration. The electronic circuitry was tested at the Circuit Card Assembly (CCA) level of production; each test exercised all circuit functions. The transistor assembly was tested during the W3 cable assembly (1356424-1) test. Refer to Figure 1 for test flow.



Antenna Subsystem and Subsystem Component Test Flow
Figure 1.

The antenna drive subsystem satisfactorily passed all of the performance requirements. There were no failures in any of the antenna drive components during subsystem testing.

The results of the subsystem and component level testing are discussed in more detail in the following sections:

3.0 TEST CONFIGURATION

The ***Reflector Drive Assembly Tests*** confirm the operability of the motor under test. The test configuration includes, the motor, motor shaft, bearings, and a supporting housing.

The ***Circuit Card Assembly (CCA) Tests*** confirm the operability of each CCA. Each test includes the CCA under test, electronic test fixtures, and the necessary loads.

A segment of the ***Signal Processor Tests*** ensures the scan drive electronics are functioning properly prior to it's assembly into the instrument. The test configuration includes:

- Timing and Control CCA
- Scan Control Interface CCA
- Mux/ Relay Control CCA
- Interface Converter CCA
- Resolver Data Isolator CCA
- R/D Converter CCA
- Motor Driver CCA
- Test fixture and cabling to simulate the 1553 bus interface
- Test fixture and cabling to interrogate and analyze positional data
- Test motor and inertia wheel

The ***Transistor Assembly Test*** verifies the correct wiring of the transistor assembly and associated cabling. Test configuration includes the CKT 1000 (continuity and Hi-Pot tester), and test fixtures.

The Antenna Drive Subsystem Tests:

- Are configured with the same motor control CCA's used in the signal processor test, interconnecting wiring, the power transistor assembly, and the drive assembly with reflector.
- The antenna drive subsystem components were all installed in the instrument when the subsystem test was performed.
- DC power for the motor control circuit cards was provided by a DC/DC converter simulator P/N: 1359322-1. The simulator operates on 120VAC facility supplied

power. The power for the reflector motor drive circuits however was provided directly by the STE Noisy Bus power supply.

4.0 TEST SETUP

The antenna drive subsystem tests are performed during system integration. During system integration testing, the instrument is proven electrically safe via ground isolation, and power distribution checks. Next, the communication link is exercised to ensure commands are received and interpreted correctly. The Antenna Drive Subsystem Test is then performed.

5.0 TEST RESULTS

The Antenna Drive Subsystem components designated for use in the EOS AMSU-A1 instrument are shown in Table 1.

CCA (A1-1)	S/N
Resolver Data Isolator Assembly (A1-1)	F25
Interface Converter Assembly (A1-1)	F19
Motor Driver Assembly (A1-1)	F01
R/D Converter/ Oscillator Assembly (A1-1)	F21

CCA (A1-2)	S/N
Resolver Data Isolator Assembly (A1-2)	F26
Interface Converter Assembly (A1-2)	F20
Motor Driver Assembly (A1-2)	F02
R/D Converter/ Oscillator Assembly (A1-2)	F16

OTHER	S/N
Reflector Drive Motor (A1-1)	F04
Reflector Drive Motor (A1-2)	F05
Signal Processor	F01
Transistor Assembly (W3 cable)	N/A

Table 1.
EOS AMSU-A1 S/N: 202 Antenna
Subsystem Component S/N Designations

During preliminary testing of these components (in preparation for the antenna drive subsystem test), several component failures occurred. The component failures and system related dispositions are listed below:

- ***Reflector Drive Motor (A1-1)*** - during assembly test, it was noted that the motor was binding. It was determined that excessive bonding material was used and it flowed onto the shaft. The shaft was cleaning

and tests showed a positive resolution. The process planning was altered to reduce the risks of recurrence.

- ***Reflector Drive Motor (A1-2)*** - during vibration testing the resonant frequency shifted. The motor was disassembled but anomalies were found. Electronic tests found nothing abnormal either. The motor was successfully re-vibrated without failure.

All other components designated for use in the EOS AMSU-A1 instrument (pertaining to the scan drive circuitry) passed on the first time through component testing.

5.1 REFLECTOR DRIVE ASSEMBLIES

The tests performed on this unit are: Starting Torque Test, Motor Commutation Test, Resolver Operation/ No-Load Speed Test, and Random Vibration. The Motor Commutation and Resolver Operation tests are performed both pre and post-vibration.

<u>Starting Torque</u>
The starting torque test is performed on the rotating segment of the drive assembly to verify the torque associated with bearing friction. Reflector drive assembly (F04) failed the starting torque test at ambient temperature. The motor was binding due to a process error. Bonding material flowed onto the motor shaft preventing it from turning with voltage applied. The shaft was cleaned and re-tested. The reflector drive assembly (F04) then passed the starting torque test at ambient temperature as well as at the colder plateaus.

Reflector drive assembly (F05) passed the starting torque test at ambient temperature as well as at the colder plateaus first time through testing.

<u>Motor Commutation Test</u>
This test is performed to determine the commutation characteristics of the motor under test. Both reflector drive assemblies (F04 and F05) passed the motor commutation test both pre- and post-vibration tests without incident.

<u>Resolver Operation/ No-Load Speed Test</u>
This test is performed to verify resolver operation as well as speed characteristics and back electromotive force of the motor. Both reflector drive assemblies (F04 and F05) passed the resolver operation/ no-load speed test both pre- and post-vibration tests without incident.

Random Vibration

Reflector drive assembly (F04) passed vibration testing first time through. The motor assembly also passed the pre- and post-vibration electronic tests as well as the post-vibration visual inspection without incident.

Reflector drive assembly (F05) experienced a significant change in resonant frequency at the random vibration, -6db level. The motor was disassembled, but no anomalies were found. The motor was successfully re-tested and returned to vibration testing. The motor was re-vibrated without incident. The reflector drive assembly passed the pre- and post-vibration electronic tests as well as the post-vibration visual inspection without incident.

5.2 CIRCUIT CARD ASSEMBLIES

Test procedures were prepared for each motor control circuit card; document revision status is controlled by reference in the shop order. The cards were individually tested to the procedures and results were recorded on data sheets found in Appendix A. The following list indexes the CCA Test Data Sheets:

- *Appendix A1 .... Resolver Data Isolator Assembly (A1-1)*
- *Appendix A2 .... Resolver Data Isolator Assembly (A1-2)*
- *Appendix A3 .... Interface Converter Assembly (A1-1)*
- *Appendix A4 .... Interface Converter Assembly (A1-2)*
- *Appendix A5 .... Motor Driver Assembly (A1-1)*
- *Appendix A6 .... Motor Driver Assembly (A1-2)*
- *Appendix A7 .... R/D Converter/ Oscillator Assembly (A1-1)*
- *Appendix A8 .... R/D Converter/ Oscillator Assembly (A1-2)*

All circuit card assemblies passed testing the first time through. The assembly build shop orders contain the part number and accept tag record the of test and select resistors.

5.3 SIGNAL PROCESSOR

For the first time, the entire antenna drive motor electronics is mated together. The test instrumentation commands and interrogates the electronics during this segment of testing. The instrumentation sends position commands to the Interface Converter CCA. The Interface Converter D/A's the command and provides inputs to the Motor Driver CCA. The test motor (instrumentation) responds to the drive signal and feeds back positional data via resolver outputs. The instrumentation then interrogates the Resolver Data Isolator CCA for position data. A comparison is made in the instrumentation between the

position command sent and the actual position received. The pass/ fail indication is presented to the operator for test data sheet recording.

The signal processor assembly (F01) passed all scan drive tests.

5.4 TRANSISTOR ASSEMBLY

All transistor assemblies are tested along with their respective W3 cable. The cable is continuity, then hi-pot tested prior to attaching the transistor circuitry. Each transistor pair is exercised validating the turn on voltage, current drawn, and cable wiring as well. The W3 cable assembly was placed on an Inspection Report (IR# 101780) for cracks in a connector. The connector was subsequently repair by applying .003 inch minimum 2216 epoxy over the cracks. This action precludes the separation of any connector molding material.

The W3 cable and transistor assembly underwent component testing and passed without incident.

5.5 ANTENNA SUBSYSTEM DRIVE TESTS

The antenna drive motor electronics mates with the instrument microprocessor for the first time during this segment of testing. The microprocessor sends position commands from the memory CCA to the Interface Converter CCA. The Interface Converter D/A's the command and provides inputs to the Motor Driver CCA. The Reflector Drive Motor responds to the drive signals and feeds back positional data via the resolver outputs. The microprocessor then interrogates the Resolver Data Isolator CCA for position data.. The microprocessor in turn communicates with the 1553 interface which subsequently relays positional data to the STE.

During other segments of the test, positional data is monitored via a potentiometer attached to the shaft of each reflector drive assembly. This provides scan characteristic information in regard to overshoot, jitter, and beam position transition timing for each motor assembly.

The remaining paragraphs in this section discuss tests that ensures the instrument complies with specific operating parameters. Prior to conducting these tests there is a series of preliminary checks that are run to select component values that customize the operating parameters of each motor. These checks perform the following functions:

- Program "on board" memory with Beam Position Pointing Angles for each reflector drive assembly
- Adjust for peak Motor Current Limits on both A1-1 and A1-2 motor drive circuits
- Observe Preliminary Scan Dynamics on both A1-1 and A1-2 motor drive circuits
- Identify Mechanical Resonant Frequencies of each reflector drive assembly

Beam Position Pointing Angles are calculated from Nadir pointing direction which is determined on the antenna range. The instrument's EPROMs (EPROMs for testing; PROMs for final configuration) are programmed to reflect the position commands. The initial programming may require fine tuning; fine tuning is determined during the remaining segments of the test procedure.

Motor Current Limits were adjusted, via selecting "test and select" resistors, to comply with the specification requirement; less than 1 amp peak current.

Preliminary Scan Dynamics looked good; transition times, overshoot and jitter were all acceptable at the sampled pointing directions (5).

The ***Mechanical Resonant Frequencies*** were identified; notch filters were calculated and installed to compensate for these resonant frequencies.

5.5.1 SCAN MOTION AND JITTER

In this test, the antenna position was measured in a series of five 8-sec full scans. The measurement was made with a 1-turn test potentiometer temporarily affixed to the rear end of the motor shaft. A Dynamic Signal Analyzer (DSA) was connected to the pot wiper to record the antenna position data. Five scans of each A1-1 and A1-2 were captured and stored on the AMSU-A1 Test Data File disc. One representative waveform from each subassembly is presented in Appendix B1 (A1-1) and Appendix B34 (A1-2).

Each 3.33 degrees scene step was expanded and checked for both a 35 msec max step time, and a 165 msec integration period. Expanded waveforms were plotted and are presented in Appendix B2 thru B31 for the A1-1 subassembly and Appendix B35 thru B64 for the A1-2 subassembly. All of the scene steps meet the step response requirement for transition time, overshoot, and jitter.

Slew periods to the cold and warm calibration stations were measured and met requirements. A time of 0.21 sec is allocated for the 35.0 degree slew to cold cal, and 0.40 sec for the 96.67 degree slew to warm cal. Calibration station jitter was less than the $\pm$ 5 % maximum permitted. Expanded waveforms for each subassembly were plotted and are presented in Appendix B32 and B33 (A1-1) and Appendix B65 and B66 (A1-2). The waveforms are also stored on the AMSU-A1 Test Data File disc. The test data sheets are presented in Appendix B67 (A1-1) and B68 (A1-2).

5.5.2 NOISY BUS PEAK CURRENT AND RISE TIME

The Noisy pulse load bus peak current and the rate of change of current were measured. The peak current must be less than 1A at any beam position along the scan. Peak current along the scan is .940A. The current rate of change while transitioning from one beam position to the next (including the transition to the cold calibration and warm calibration targets) should be greater than 35 microseconds. A random 3.33° step was selected; the transition to the next step was 1.6 ms. The transition to the warm cal position start and stop was significantly longer than the required 35 ms; 1.95 and 1.56 ms respectively.

The peak bus current was measured across the entire scan and met the requirement. The full scan waveform was plotted and is presented in Appendix C1. The waveform is also stored on the AMSU-A1 Test Data File disc. The test data sheet is presented in Appendix C2.

5.5.3 RESOLVER READING AND POSITION ERROR

The 14-bit command position word is stored in the "on-board" memory and is read to the motor drive circuitry under microprocessor program control. The microprocessor also reads the resolver output at each of the thirty scene stations, and at the cold and warm calibration positions. The readings are made at the start of integration (LOOK 1), and halfway into the integration period (LOOK 2). The resolver data is sent to the 1553 bus interface for subsequent transmission to the STE.

The purpose of this portion of the test is to demonstrate that the antenna is meeting beam pointing requirements.

If the antenna is out of the pointing tolerance of > ± 10 counts at LOOK 1 or > ± 5 counts at LOOK 2 , the EPROM is reprogrammed to bring the pointing direction to within the prescribe tolerances. A copy of the STE computer print out showing the pointing direction is shown in Figure 2 for the A1-1 subassembly and Figure 3 for the A1-2 subassembly.

BP	Command	Actual		Difference*	
		Look 1	Look2	Look 1	Look2
1	14520	14522	14522	-2	-2
2	14672	14677	14671	-5	1
3	14824	14830	14823	-6	1
4	14975	14985	14974	-10	1
5	15127	15134	15127	-7	0
6	15279	15286	15279	-7	0
7	15430	15439	15429	-9	1
8	15582	15590	15582	-8	0
9	15734	15739	15733	-5	1
10	15885	15893	15884	-8	1
11	16037	16043	16036	-6	1
12	16189	16196	16188	-7	1
13	16340	16349	16339	-9	1
14	108	116	108	-8	0
15	260	265	260	-5	0
16	411	421	410	-10	1

BP	Command	Actual		Difference*	
		Look 1	Look2	Look 1	Look2
17	563	571	563	-8	0
18	715	720	714	-5	1
19	866	874	865	-8	1
20	1018	1023	1017	-5	1
21	1170	1176	1169	-6	1
22	1321	1331	1321	-10	0
23	1473	1479	1473	-6	0
24	1625	1631	1625	-6	0
25	1776	1784	1775	-8	1
26	1928	1936	1928	-8	0
27	2080	2085	2079	-5	1
28	2231	2238	2230	-7	1
29	2383	2388	2382	-5	1
30	2535	2541	2534	-6	1
CC 1	4129	4132	4132	-3	-3
WC	8528	8527	8527	1	1

* Difference between Command and Actual

Figure 2. Beam Position Pointing Directions and Error Calculation for A1-1

BP	Command	Actual		Difference*	
		Look 1	Look2	Look 1	Look2
1	14168	14169	14169	-1	-1
2	14320	14324	14319	-4	1
3	14472	14473	14469	-1	3
4	14623	14625	14622	-2	1
5	14775	14775	14773	0	2
6	14927	14930	14926	-3	1
7	15078	15082	15078	-4	0
8	15230	15234	15233	-4	-3
9	15382	15385	15381	-3	1
10	15533	15538	15533	-5	0
11	15685	15687	15684	-2	1
12	15837	15841	15835	-4	2
13	15988	15990	15986	-2	2
14	16140	16141	16138	-1	2
15	16292	16295	16290	-3	2
16	59	62	57	-3	2

BP	Command	Actual		Difference*	
		Look 1	Look2	Look 1	Look2
17	211	212	210	-1	1
18	363	366	361	-3	2
19	514	518	513	-4	1
20	666	670	664	-4	2
21	818	819	816	-1	2
22	969	971	967	-2	2
23	1121	1121	1119	0	2
24	1273	1276	1272	-3	1
25	1424	1427	1422	-3	2
26	1576	1578	1575	-2	1
27	1728	1731	1726	-3	2
28	1879	1883	1878	-4	1
29	2031	2035	2029	-4	2
30	2183	2184	2181	-1	2
CC 1	3777	3779	3779	-2	-2
WC	8176	8178	8178	-2	-2

* Difference between Command and Actual

Figure 3. Beam Position Pointing Directions and Error Calculation for A1-2

5.5.4 GAIN/PHASE MARGIN

A gain/phase margin test was performed on the antenna drive subsystem. The test was performed by obtaining a Bode plot of the control loop and measuring the gain at 180° phase differential and the phase margin at the 0db crossover point.

The Dynamic Signal Analyzer (DSA) was used to make the measurement operating in the swept sine mode. Three separate Bode plots were made on the antenna and the gain and phase margins were determined from each plot. The gain margin measured was 9.55 db (average of three) for the A1-1 subsystem and 9.26 db (average of three) for the A1-2 subsystem. The phase margin measured was 71.1° (average of three) for the A1-1 subsystem and 70.0° (average of three) for the A1-2 subsystem. These margins exceed the specification requirements of 9.2 db and 25 degrees and therefore are acceptable. The three Bode waveforms were plotted and are presented in Appendix D1 thru D3 for the A1-1 subsystem and Appendix D4 thru D6 for the A1-2 subsystem. The waveforms are also stored on the AMSU-A1 Test Data File disc. The test data sheets are presented in Appendix D7and D8 for A1-1 and A1-2 respectively.

5.5.5 OPERATIONAL GAIN MARGIN

An operational gain margin test was performed on the instrument three times. This test consists of increasing the gain of the control loop until oscillation occurs. The gain increase and frequency of oscillation are measured. An increase in gain greater than 8 db is required; the frequency of oscillation is an observation.

A 50K pot was connected in series with the R58 feedback resistor on amplifier AR8. The resistance of the test pot was slowly added to the feedback resistor while observing the reflector for oscillations.

The reflector begins to produce an audible sound as gain is increased. The following added resistance values are calculated to have the following gain margins for the A1-1 and A1-2 subsystems:

Resistance (ohms)	Gain
36.94 K	8.6 db
36.01 K	8.4 db
36.03 K	8.4 db

A1-1

Resistance (ohms)	Gain
34.16 K	8.1 db
37.67 K	8.7 db
34.32 K	8.2 db

A1-2

The first mode mechanical resonance of the shaft and reflector is about 171 Hz for the A1-1 subsystem. The power spectrum waveform was plotted and is presented in Appendix E1. The first mode mechanical resonance of the shaft and reflector is about 181 Hz for the A1-2 subsystem. The power spectrum waveform was plotted and is presented in Appendix E2. These waveforms are also stored on the AMSU-A1 Test Data File disc. The test data sheets are presented in Appendix E3 and E4 for the A1-1 and A1-2 subsystems respectively.

6.0 CONCLUSION

Based on the test results, it can be concluded that the EOS AMSU-A1 S/N 202 antenna drive subsystem meets the AMSU-A specification requirements.

7.0 TEST DATA

Test data for the EOS AMSU-A1 S/N 202 obtained in the antenna drive subsystem test is attached. Data sheet number and type of test is shown in the following Appendix Index.

APPENDIX INDEX

TEST DATA SHEET B-6 (Sheet 1 of 2)

RESOLVER DATA ISOLATOR CCA (P/N 1334972) (Paragraph 6.6.7.)

Date: 4/14/97
S/N: F-25
1334972-1

6.6.7.1 Supply Voltages

Supply*	Measured Value (V)	Limits (Vdc)	Pass/Fail
+5 V (I)	5.00	± 0.25	P
+5 V (U)	5.01	± 0.25	P

6.6.7.2 Supply Currents

Steps 1 and 2:

Supply*	Measured Value (mA)	Limits (mA)	Pass/Fail
+5 V (I)	53.28	100 max	P
+5 V (U)	3~~2~~8.30	400 max	P

PL

Steps 3 and 4:

Supply*	Measured Value (mA)	Limits (mA)	Pass/Fail
+5 V (I)	82.47	150 max	P
+5 V (U)	11.04	30 max	P

* I = Isolated, U = Unisolated

6.6.7.3 Resolver Data

Bit No.	Pass/Fail
API 0 - AP Bit 0	P
API 1 - AP Bit 1	P
API 2 - AP Bit 2	P
API 3 - AP Bit 3	P
API 4 - AP Bit 4	P
API 5 - AP Bit 5	P
API 6 - AP Bit 6	P
API 7 - AP Bit 7	P
API 8 - AP Bit 8	P
API 9 - AP Bit 9	P
API 10 - AP Bit 10	P
API 11 - AP Bit 11	P
API 12 - AP Bit 12	P
API 13 - AP Bit 13	P

6.6.7.4 Converter Busy Pulse

Converter Busy Pulse	Measured Value (µsec)	Limits (µsec)	Pass/Fail
15.0	14.9	± 3.0	P

TEST DATA SHEET B-6 (Sheet 2 of 2)

RESOLVER DATA ISOLATOR CCA (P/N 1334972) (Paragraph 6.6.7)

Comments: NONE

Conducted by: Dennis Lum 4/14/97
Test Engineer Date

Verified by: Judie Harvey 4-16-97
Quality Control Inspector Date

Approved by: 4/16/97
DCMC Date

AE-26693A
10 Feb 97

TEST DATA SHEET B-6 (Sheet 1 of 2)

RESOLVER DATA ISOLATOR CCA (P/N 1334972) (Paragraph 6.6.7)

Date: 4/14/97
S/N: F-26
1334972-1

6.6.7.1 Supply Voltages

Supply*	Measured Value (V)	Limits (Vdc)	Pass/Fail
+5 V (I)	5.00	± 0.25	P
+5 V (U)	5.00	± 0.25	P

6.6.7.2 Supply Currents

Steps 1 and 2:

Supply*	Measured Value (mA)	Limits (mA)	Pass/Fail
+5 V (I)	53.31	100 max	P
+5 V (U)	322.00	400 max	P

Steps 3 and 4:

Supply*	Measured Value (mA)	Limits (mA)	Pass/Fail
+5 V (I)	83.37	150 max	P
+5 V (U)	11.11	30 max	P

* I = Isolated, U = Unisolated

6.6.7.3 Resolver Data

Bit No.	Pass/Fail
API 0 - AP Bit 0	P
API 1 - AP Bit 1	P
API 2 - AP Bit 2	P
API 3 - AP Bit 3	P
API 4 - AP Bit 4	P
API 5 - AP Bit 5	P
API 6 - AP Bit 6	P
API 7 - AP Bit 7	P
API 8 - AP Bit 8	P
API 9 - AP Bit 9	P
API 10 - AP Bit 10	P
API 11 - AP Bit 11	P
API 12 - AP Bit 12	P
API 13 - AP Bit 13	P

6.6.7.4 Converter Busy Pulse

Converter Busy Pulse	Measured Value (µsec)	Limits (µsec)	Pass/Fail
15.0	~~14.8~~ 14.9 DL	± 3.0	P

TEST DATA SHEET B-6 (Sheet 2 of 2)

RESOLVER DATA ISOLATOR CCA (P/N 1334972) (Paragraph 6.6.7)

Comments: NONE

Conducted by: [signature] Test Engineer — 4/14/97 Date

Verified by: [signature] Quality Control Inspector — 7A 269 — 4-14-97 Date

Approved by: [signature] DCMC — 4/14/97 Date

TEST DATA SHEET B-13 (Sheet 1 of 3)

INTERFACE/CONVERTER CCA (P/N 1331697) (Paragraph 6.13.7)

Date: 5/5/97
CCA S/N: F¢19
1331697-1

6.13.7.1 Supply Voltages

Supply	Measured Value (Vdc)	Limits (Vdc)	Pass/Fail
+5V (U)	5.00V	+5V± 0.05	P
+15V (I)	15.03V	+15V± 0.15	P
-15V (I)	-15.00V	-15V± 0.15	P
+5V (I)	+5.01 V	+5V± 0.05	P

6.13.7.2 Supply Currents

Step 1 (CP and API Low):

Supply	Measured Value (mA)	Limits (mA)	Pass/Fail
+5V (U)	85.98	70 - 110	P
+5V (I)	3.40	1.5 - 5.5	P
+15V (I)	17.71	15 - 23	P
-15V (I)	20.37	18 - 26	P

Step 2 (CP and API High):

Supply	Measured Value (mA)	Limits (mA)	Pass/Fail
+5V (U)	56.20	40 - 70	P
+5V (I)	23.83	18 - 30	P
+15V (I)	17.70	15 - 23	P
-15V (I)	20.34	18 - 26	P

6.13.7.3 Amplifier Offsets

Amplifier	Measured Value (mV)	Limits (mV)	Pass/Fail
AR1	-0.01	0.0 ±0.15	P
AR2	0.20	0.0 ±2.0	P

TEST DATA SHEET B-13 (Sheet 2 of 3)

INTERFACE/CONVERTER CCA (P/N 1331697) (Paragraph 6.13.7)

6.13.7.4 Subtraction and D-A Conversion

Step 1:

Actual Position (API) MSB LSB	Command Position (CP) MSB LSB	AR1 Output* Voltage Required (Vdc)	Test Result (Vdc)	Pass/Fail
00000000000000	00000000000000	0.00000	-0.00001	P
00000000000001	00000000000000	-0.00061	-0.00061	P
00000000000010	00000000000000	-0.00122	-0.00124	P
00000000000011	00000000000000	-0.00184	-0.00188	P
00000000000100	00000000000000	-0.00245	-0.00249	P
00000000001000	00000000000000	-0.00490	-0.00499	P
00000000010000	00000000000000	-0.00979	-0.01000	P
00000000100000	00000000000000	-0.01958	-0.02004	P
00000001000000	00000000000000	-0.03917	-0.04011	P
00000010000000	00000000000000	-0.07834	-0.08025	P
00000100000000	00000000000000	-0.15667	-0.16053	P
00001000000000	00000000000000	-0.31334	-0.32113	P
00010000000000	00000000000000	-0.62669	-0.64240	P
00100000000000	00000000000000	-1.25338	-1.2850	P
01000000000000	00000000000000	-2.50675	-2.5699	P
10000000000000	**00000000000000**	**-5.01350**	-5.1398	P

* Tolerance on output voltage is ± 10%

Step 2:

Actual Position (API) MSB LSB	Command Position (CP) MSB LSB	AR1 Output* Voltage Required (Vdc)	Test Result (Vdc)	Pass/Fail
00000000000000	00000000000000	0.00000	+0.00001	P
00000000000000	00000000000001	0.00061	+0.00055	P
00000000000000	00000000000010	0.00122	+0.00116	P
00000000000000	00000000000011	0.00184	+0.00171	P
00000000000000	00000000000100	0.00245	+0.00242	P
00000000000000	00000000001000	0.00490	+0.00493	P
00000000000000	00000000010000	0.00979	+0.00999	P
00000000000000	00000000100000	0.01958	+0.02003	P
00000000000000	00000001000000	0.03917	+0.04010	P
00000000000000	00000010000000	0.07834	+0.08026	P
00000000000000	00000100000000	0.15667	+0.16063	P
00000000000000	00001000000000	0.31334	+0.32128	P
00000000000000	00010000000000	0.62669	+0.64263	P
00000000000000	00100000000000	1.25338	+1.2849	P
00000000000000	01000000000000	2.50675	+2.5698	P
00000000000000	**10000000000000**	**-5.01350**	-5.1399	P

* Tolerance on output voltage is ± 10%

AE-26693A
10 Feb 97

TEST DATA SHEET B-13 (Sheet 3 of 3)

INTERFACE/CONVERTER CCA (P/N 1331697) (Paragraph 6.13.7)

6.13.7.5 Strobe Function

Step 1: Strobe Low

	Pass/Fail
No E11 Change with Input CP Changes	P

Step 2: Strobe High

	Pass/Fail
E11 Change with Input CP Changes	P

6.13.7.6 Amplifier Gain

	Measured Value (Vdc)	Limits (Vdc)	Pass/Fail
E11	0.32128	-	P
E10	+3.5387	-	P
E10 Voltage / E11 Voltage		10.7 - 11.3	11.01

6.13.7.7 Ground Isolation

	Measured Value (MΩ)	Limits (MΩ)	Pass/Fail
Pin 91 to Pin 7 DC Resistance	∞	>20	P

Comments: NONE

Conducted by:	Dennis Lew (signature) Test Engineer	5/5/97 Date
Verified by:	(signature) QA 269 Quality Control Inspector	5/8/97 Date
Approved by:	(signature) DCMC	5/13/97 Date

TEST DATA SHEET B-13 (Sheet 1 of 3)

INTERFACE/CONVERTER CCA (P/N 1331697) (Paragraph 6.13.7)

Date: 5/6/97
CCA S/N: F20
1331697-1

6.13.7.1 Supply Voltages

Supply	Measured Value (Vdc)	Limits (Vdc)	Pass/Fail
+5V (U)	+5.01 V	+5V± 0.05	P
+15V (I)	+15.03 V	+15V± 0.15	P
-15V (I)	-15.01 V	-15V± 0.15	P
+5V (I)	+5.00V	+5V± 0.05	P

6.13.7.2 Supply Currents

Step 1 (CP and API Low):

Supply	Measured Value (mA)	Limits (mA)	Pass/Fail
+5V (U)	86.17 mA	70 - 110	P
+5V (I)	3.37 mA	1.5 - 5.5	P
+15V (I)	17.91 mA	15 - 23	P
-15V (I)	20.69 mA	18 - 26	P

Step 2 (CP and API High):

Supply	Measured Value (mA)	Limits (mA)	Pass/Fail
+5V (U)	56.24mA	40 - 70	P
+5V (I)	23.81 mA	18 - 30	P
+15V (I)	17.91 mA	15 - 23	P
-15V (I)	20.69 mA	18 - 26	P

6.13.7.3 Amplifier Offsets

Amplifier	Measured Value (mV)	Limits (mV)	Pass/Fail
AR1	+0.05	0.0 ±0.15	P
AR2	+0.27	0.0 ±2.0	P

TEST DATA SHEET B-13 (Sheet 2 of 3)

INTERFACE/CONVERTER CCA (P/N 1331697) (Paragraph 6.13.7)

6.13.7.4 Subtraction and D-A Conversion

Step 1:

Actual Position (API) MSB LSB	Command Position (CP) MSB LSB	AR1 Output* Voltage Required (Vdc)	Test Result (Vdc)	Pass/Fail
00000000000000	00000000000000	0.00000	+0.00005	P
00000000000001	00000000000000	-0.00061	-0.00057	P
00000000000010	00000000000000	-0.00122	-0.00120	P
00000000000011	00000000000000	-0.00184	-0.00186	P
00000000000100	00000000000000	-0.00245	-0.00248	P
00000000001000	00000000000000	-0.00490	-0.00501	P
00000000010000	00000000000000	-0.00979	-0.01010	P
00000000100000	00000000000000	-0.01958	-0.02026	P
00000001000000	00000000000000	-0.03917	-0.04059	P
00000010000000	00000000000000	-0.07834	-0.08127	P
00000100000000	00000000000000	-0.15667	-0.16263	P
00001000000000	00000000000000	-0.31334	-0.32537	P
00010000000000	00000000000000	-0.62669	-0.65100	P
00100000000000	00000000000000	-1.25338	-1.3023	P
01000000000000	00000000000000	-2.50675	-2.6047	P
10000000000000	00000000000000	-5.01350	-5.2094	P

* Tolerance on output voltage is ± 10%

Step 2:

Actual Position (API) MSB LSB	Command Position (CP) MSB LSB	AR1 Output* Voltage Required (Vdc)	Test Result (Vdc)	Pass/Fail
00000000000000	00000000000000	0.00000	+0.00004	P
00000000000000	00000000000001	0.00061	+0.00060	P
00000000000000	00000000000010	0.00122	+0.00125	P
00000000000000	00000000000011	0.00184	+0.00180	P
00000000000000	00000000000100	0.00245	+0.00251	P
00000000000000	00000000001000	0.00490	+0.005055	P
00000000000000	00000000010000	0.00979	+0.010176	P
00000000000000	00000000100000	0.01958	+0.020350	P
00000000000000	00000001000000	0.03917	+0.040695	P
00000000000000	00000010000000	0.07834	+0.081385	P
00000000000000	00000100000000	0.15667	+0.16281	P
00000000000000	00001000000000	0.31334	+0.32569	P
00000000000000	00010000000000	0.62669	+0.65141	P
00000000000000	00100000000000	1.25338	+1.3021	P
00000000000000	01000000000000	2.50675	+2.6044	P
00000000000000	10000000000000	-5.01350	-5.2094	P

* Tolerance on output voltage is ± 10%

TEST DATA SHEET B-13 (Sheet 3 of 3)

INTERFACE/CONVERTER CCA (P/N 1331697) (Paragraph 6.13.7)

6.13.7.5 Strobe Function

Step 1: Strobe Low

	Pass/Fail
No E11 Change with Input CP Changes	P

Step 2: Strobe High

	Pass/Fail
E11 Change with Input CP Changes	P

6.13.7.6 Amplifier Gain

	Measured Value (Vdc)	Limits (Vdc)	Pass/Fail
E11	0.32569	-	P
E10	3.5835	-	P
E10 Voltage / E11 Voltage	11.0	10.7 - 11.3	P

6.13.7.7 Ground Isolation

	Measured Value (MΩ)	Limits (MΩ)	Pass/Fail
Pin 91 to Pin 7 DC Resistance	∞	>20	P

Comments:
NONE

Conducted by:	[signature] Test Engineer	5/6/97 Date
Verified by:	[signature] Quality Control Inspector	5/8/97 Date
Approved by:	[signature] DCMC	5/13/97 Date

TEST DATA SHEET B-4 (Sheet 1 of 2)

MOTOR DRIVER 3-HALL SENSOR CCA (P/N 1331694) (Paragraph 6.4.3)

S/N: FØ1
Date: 4/30/97
1331694-3

6.4.3.2 Input Signal Offset

Step No.	Test Results	Limits
4	0.75 mV	0.0 ±1 mVdc
6	1.18 mV	0.0 ±1 mVdc
8	0.98 mV	0.0 ±1 mVdc

Step No.	Test Resistor	Resistance Measured
13	E7-E8 (R25)	3.40k
	E9-E10 (R52)	4.28k
	E11-E12 (R33)	3.16k
	E13-E14 (R53)	4.76k
	E15-E16 (R42)	3.40k
	E17-E18 (R54)	4.72k

Step No.	Resistors	Selected Trim Resistors
14	R25	RNC55J34Ø1FS
	R52	RNC55J4221FS
	R33	RNC55J3161FS
	R53	RNC55J4751FS
	R42	RNC55J34Ø1FS
	R54	RNC55J4751FS

Step No.	E Point	Test Results	Limits	Pass/Fail
19	E19	0.09 mV	0.0 ±1 mVdc	P
	E20	-0.02 mV	0.0 ±1 mVdc	P
	E21	0.01 mV	0.0 ±1 mVdc	P

6.4.3.3 Motor Driver Operation

Clockwise Rotation:

Step No.	Test Results	Limits	Pass/Fail
2	4.93V	+5V±0.05Vdc	P
	51.40mA	70mAdc max	P
	15.07V	+15V±0.15Vdc	P
	1.50mA	3.0mAdc max	P
	-14.98V	-15V±0.15Vdc	P
	18.7mA	25mAdc max	P
	28.10V	+28V±0.5Vdc	P
	5.6mA	8mAdc max	P
3	272 mV	400mVdc max	P
4	42.7mA	50mAdc max	P
5	48.3mA	50mAdc max	P

AE-26693A
10 Feb 97

TEST DATA SHEET B-4 (Sheet 2 of 2)

MOTOR DRIVER 3-HALL SENSOR CCA (P/N 1331694) (Paragraph 6.4.3)

Counter Clockwise Rotation:

Step No.	Test Results	Limits	Pass/Fail
3	264 mV	400mVdc max	P
4	36.6 mA	50mAdc max	P
5	40.2 mA	50mAdc max	P

6.4.3.4 Current Limit Test

Step No.	Test Results	Limits	Pass/Fail
3 ~~2~~	466 mA	350-500mAdc	P

W Hummel
3-3-97
QC 227 3/3/97

Comments: NONE

Conducted by: Dennis Liu, Test Engineer — Date: 4/30/97

Verified by: Judy Hervey, Quality Control Inspector, QA 269 — Date: 5-3-97

Approved by: Richard Koones, DCMC — Date: 20/8/97

TEST DATA SHEET B-4 (Sheet 1 of 2)

MOTOR DRIVER 3-HALL SENSOR CCA (P/N 1331694) (Paragraph 6.4.3)

S/N: F02
Date: 4/30/97
1331694-3

6.4.3.2 Input Signal Offset

Step No.	Test Results	Limits
4	1.24mV	0.0 ±1 mVdc
6	1.20mV	0.0 ±1 mVdc
8	1.30mV	0.0 ±1 mVdc

Step No.	Test Resistor	Resistance Measured
13	E7-E8 (R25)	4.22K
	E9-E10 (R52)	7.30K
	E11-E12 (R33)	3.16K
	E13-E14 (R53)	4.73K
	E15-E16 (R42)	2.80K
	E17-E18 (R54)	4.20K

Step No.	Resistors	Selected Trim Resistors
14	R25	RNC55J4221FS
	R52	RNC55J7321FS
	R33	RNC55J3161FS
	R53	RNC55J4751FS
	R42	RNC55J2801FS
	R54	RNC55J4221FS

Step No.	E Point	Test Results	Limits	Pass/Fail
19	E19	-0.04 mV	0.0 ±1 mVdc	P
	E20	-0.04 mV	0.0 ±1 mVdc	P
	E21	0.00 mV	0.0 ±1 mVdc	P

6.4.3.3 Motor Driver Operation

Clockwise Rotation:

Step No.	Test Results	Limits	Pass/Fail
2	4.93V	+5V±0.05Vdc	P
	51.8mA	70mAdc max	P
	15.07V	+15V±0.15Vdc	P
	1.5mA	3.0mAdc max	P
	-14.98V	-15V±0.15Vdc	P
	18.4mA	25mAdc max	P
	28.10V	+28V±0.5Vdc	P
	5.6mA	8mAdc max	P
3	285mV	400mVdc max	P
4	42.6mA	50mAdc max	P
5	47.8mA	50mAdc max	P

AE-26693A
10 Feb 97

TEST DATA SHEET B-4 (Sheet 2 of 2)

MOTOR DRIVER 3-HALL SENSOR CCA (P/N 1331694) (Paragraph 6.4.3)

Counter Clockwise Rotation:

Step No.	Test Results	Limits	Pass/Fail
3	285 mV	400mVdc max	P
4	36.9 mA	50mAdc max	P
5	40.4 mA	50mAdc max	P

6.4.3.4 Current Limit Test

Step No.	Test Results	Limits	Pass/Fail
3 ~~2~~	447 mA	350-500mAdc	P

W Hummel 3-3-97 QC 227 3/3/97

Comments: NONE

Conducted by: Test Engineer — Date 4/30/97

Verified by: Quality Control Inspector — 7A 269 — Date 5-3-97

Approved by: DCMC — Date 10/8/97

TEST DATA SHEET B-5 (Sheet 1 of 3)

R-D CONVERTER/OSCILLATOR CCA (P/N 1337739) (Paragraph 6.5.7)

Date 3/27/97
CCA S/N F21
1337739-1

6.5.7.1 UUT Pre-Test

Step 2:

Supply Currents (Without UUT)

Supply (Vdc)	(Baseline) Measured Value (mA) (Without UUT)	Limits (mA)	Pass/Fail
+15	0.06	0-1	P
-15	-0.28	-1 - 0	P
+5	0.06	0-1	P

Supply Voltages (Without UUT)

Supply	Measured Value (V)	Limits (V)	Pass/Fail
+15V (I)	15.02	± 0.50	P
-15V (I)	-15.01	± 0.50	P
+5V (I)	5.03	±0.25	P

Step 6:

Supply Currents (UUT Installed)

Supply (Vdc)	Measured Value (mA) (UUT Installed)	Difference (mA) (Measured - Baseline)	Limits (mA)	Pass/Fail
+15	30.68	30.62	20-40	P
-15	-36.36	-36.08	-30 - -50	P
+5	56.10	56.04	30-70	P

6.5.7.2 Supply Voltages (UUT Installed)

Supply	Measured Value (V)	Limits (V)	Pass/Fail
+15V (I)	15.01	± 0.50	P
-15V (I)	-14.97	± 0.50	P
+5V (I)	5.02	±0.25	P

6.5.7.3 Oscillator Frequency, Duty Cycle, and Output Voltage

Parameter	Measured Value	Limits	Pass/Fail
Frequency	1610 Hz	1550-1650 Hz	P
Duty Cycle	51.5%	45-55 %	P
Output Voltage	7.91V	7.6-8.4 Vrms	P

AE-26693B
19 Jun 97

TEST DATA SHEET B-5 (Sheet 2 of 3)

R-D CONVERTER/OSCILLATOR CCA (P/N 1337739) (Paragraph 6.5.7)

6.5.7.4 R-D Converter Operation

Step 1:

Bit Number/ Test Fixture Label	CW Pass/Fail	CCW Pass/Fail
API 0/1	P	P
API 1/2	P	P
API 2/3	P	P
API 3/4	P	P
API 4/5	P	P
API 5/6	P	P
API 6/7	P	P
API 7/8	P	P
API 8/9	P	P
API 9/10	P	P
API 10/11	P	P
API 11/12	P	P
API 12/13	P	P
API 13/14	P	P
Converter Busy	P	P

Step 2:

RS (E10)	Measured Value (Vdc)	Calculated Value (Vdc) * CCA -1 Assy	Calculated Value (Vdc) * CCA -2 Assy	Pass/Fail
CW Rotation**	1.447V	(+) 1.790 V	(+) N/A	P
CCW Rotation**	-1.521	(-) 1.790 V	(-) N/A	P

* Signal level function of test and calibration gain resistors. Record calculated value and measured value. Measured value shall be within ±~~10~~ 20 percent of calculated value. The equation is as follows:

QC 223 [illegible] 3-26-97

$$V = \pm 0.155\left(\frac{R20}{R17}\right) \pm \cancel{10}\ 20\% = 0.155\left(\frac{59K}{5.11K}\right) = 1.790\ V$$

[illegible] 223 [illegible] 3-26-97

6.5.7.5 Amplifier Gain

PES-RS	Measured Value (Vdc)	Limits (Vdc)	Pass/Fail
PES = +0.300 Vdc	1.061	1.00 to1.30	P
PES = -0.300 Vdc	1.165	1.00 to 1.30	P

6.5.7.6 Direction Control Signal

DIR CNTRL	Measured Value (Vdc)	Limits (Vdc)	Pass/Fail
CW Rotation	5.601	4.5 to 5.5	P
CCW Rotation	0.133	0.0 to 0.4	P

TEST DATA SHEET B-5 (Sheet 3 of 3)

R-D CONVERTER/OSCILLATOR CCA (P/N 1337739) (Paragraph 6.5.7)

6.5.7.7 Notch Filter Frequency Response

Frequency	Measured Value (Hz)	Calculated Value (Hz) * CCA -1 Assy	Calculated Value (Hz) * CCA -2 Assy	Pass/Fail
AR3 Notch	N/A	N/A	N/A	N/A
AR4 Notch	|	|	|	|
AR5 Notch				

* Notch frequencies shall be within ±3 percent of values determined by test and calibration resistors. Record calculated and measured values.

Comments: NONE

Conducted by: [signature] Test Engineer — Date 8/27/97

Verified by: [signature] Quality Control Inspector — Date 09/02/97

Approved by: [signature] DCMC — Date 9/2/97

TEST DATA SHEET B-5 (Sheet 1 of 3)

R-D CONVERTER/OSCILLATOR CCA (P/N 1337739) (Paragraph 6.5.7)

Date 5/14/97
CCA S/N F16
1337739-1

6.5.7.1 UUT Pre-Test

Step 2:

Supply Currents (Without UUT)

Supply (Vdc)	(Baseline) Measured Value (mA) (Without UUT)	Limits (mA)	Pass/Fail
+15	0.06 mA	0-1	P
-15	-0.28 mA	-1 - 0	P
+5	0.06 mA	0-1	P

Supply Voltages (Without UUT)

Supply	Measured Value (V)	Limits (V)	Pass/Fail
+15V (I)	15.02V	± 0.50	P
-15V (I)	-15.01V	± 0.50	P
+5V (I)	5.03V	±0.25	P

Step 6:

Supply Currents (UUT Installed)

Supply (Vdc)	Measured Value (mA) (UUT Installed)	Difference (mA) (Measured - Baseline)	Limits (mA)	Pass/Fail
+15	31.24	31.18 mA	20-40	P
-15	-40.57 [illegible]	-40.29 mA	-30 - -50	P
+5	50.58 mA	50.52 mA	30-70	P

6.5.7.2 Supply Voltages (UUT Installed)

Supply	Measured Value (V)	Limits (V)	Pass/Fail
+15V (I)	15.01V	± 0.50	P
-15V (I)	-14.96V	± 0.50	P
+5V (I)	5.02V	±0.25	P

6.5.7.3 Oscillator Frequency, Duty Cycle, and Output Voltage

Parameter	Measured Value	Limits	Pass/Fail
Frequency	1615 Hz	1550-1650 Hz	P
Duty Cycle	52 %	45-55 %	P
Output Voltage	8.005V	7.6-8.4 Vrms	P

A8

AE-26693A
10 Feb 97

TEST DATA SHEET B-5 (Sheet 2 of 3)

R-D CONVERTER/OSCILLATOR CCA (P/N 1337739) (Paragraph 6.5.7)

6.5.7.4 R-D Converter Operation

Step 1:

Bit Number/ Test Fixture Label	CW Pass/Fail	CCW Pass/Fail
API 0/1	P	P
API 1/2	P	P
API 2/3	P	P
API 3/4	P	P
API 4/5	P	P
API 5/6	P	P
API 6/7	P	P
API 7/8	P	P
API 8/9	P	P
API 9/10	P	P
API 10/11	P	P
API 11/12	P	P
API 12/13	P	P
API 13/14	P	P
Converter Busy	P	P

Step 2: wMHummel QC 16
3-4-97

~~PES-RS~~ RS (E10)	Measured Value (Vdc)	Calculated Value (Vdc) * CCA -1 Assy	Calculated Value (Vdc) * CCA -2 Assy	Pass/Fail
CW Rotation**	1.55V	1.79V	N/A	P
CCW Rotation**	-1.79V	-1.79V	N/A	P

* Signal level function of test and calibration gain resistors. Record calculated value and measured value. Measured value shall be within ±10 percent of calculated value. The equation is as follow:

$$V = 0.155\left(\frac{R20}{R17}\right) \pm \frac{2.97}{10}$$

R20 = 59k
R17 = 5.11K

wMHummel 5-15-97 QC 229

6.5.7.5 Amplifier Gain

PES-RS	Measured Value (Vdc)	Limits (Vdc)	Pass/Fail
PES = +0.300 Vdc	1.10 V	1.00 to1.30	P
PES = -0.300 Vdc	1.12 V	1.00 to 1.30	P

6.5.7.6 Direction Control Signal

DIR CNTRL	Measured Value (Vdc)	Limits (Vdc)	Pass/Fail
~~C~~CW Rotation	5.00 V	4.5 to 5.5	P
CCW Rotation	0.13V	0.0 to 0.4	P

wMHummel
5-15-97 QC 229

TEST DATA SHEET B-5 (Sheet 3 of 3)

R-D CONVERTER/OSCILLATOR CCA (P/N 1337739) (Paragraph 6.5.7)

6.5.7.7 Notch Filter Frequency Response

Frequency	Measured Value (Hz)	Calculated Value (Hz) * CCA -1 Assy	Calculated Value (Hz) * CCA -2 Assy	Pass/Fail
AR3 Notch	N/A	N/A	N/A	N/A
AR4 Notch	|	|	|	|
AR5 Notch	|	|	|	|

* Notch frequencies shall be within ±3 percent of values determined by test and calibration resistors. Record calculated and measured values.

Comments: NONE

Note

This test shall be performed at the system level during antenna drive subsystem ~~level~~ testing. QC 16

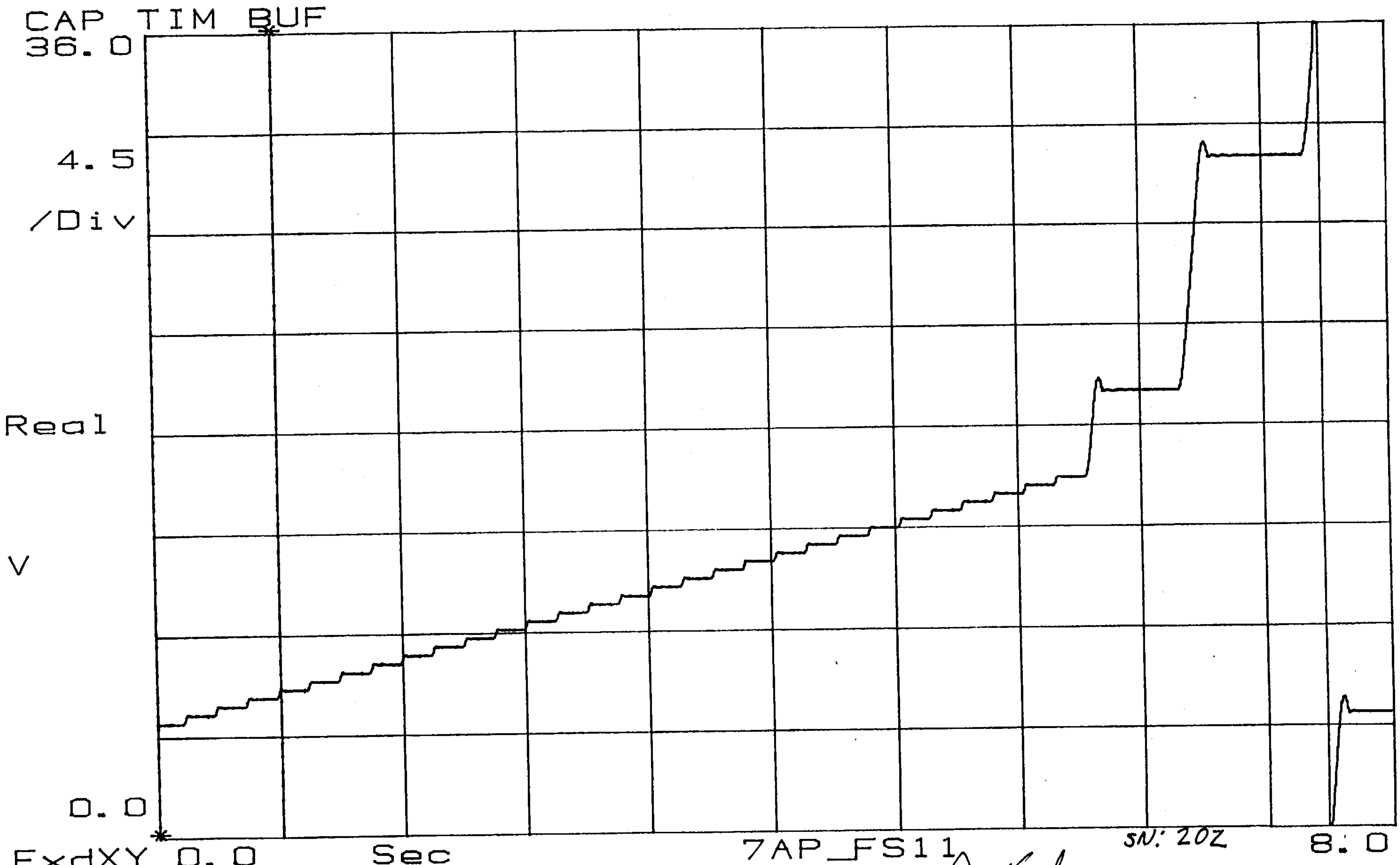
WHHummel
3-4-97

Conducted by: Dennis Luu 5/14/97
Test Engineer Date

Verified by: Judie Hervey 5/15/97
Quality Control Inspector Date

Approved by: Tonya L. Ignowski-Clark 5/15/97
DCMC Date

B1



7AP_FS11

SN: 202

3445_7

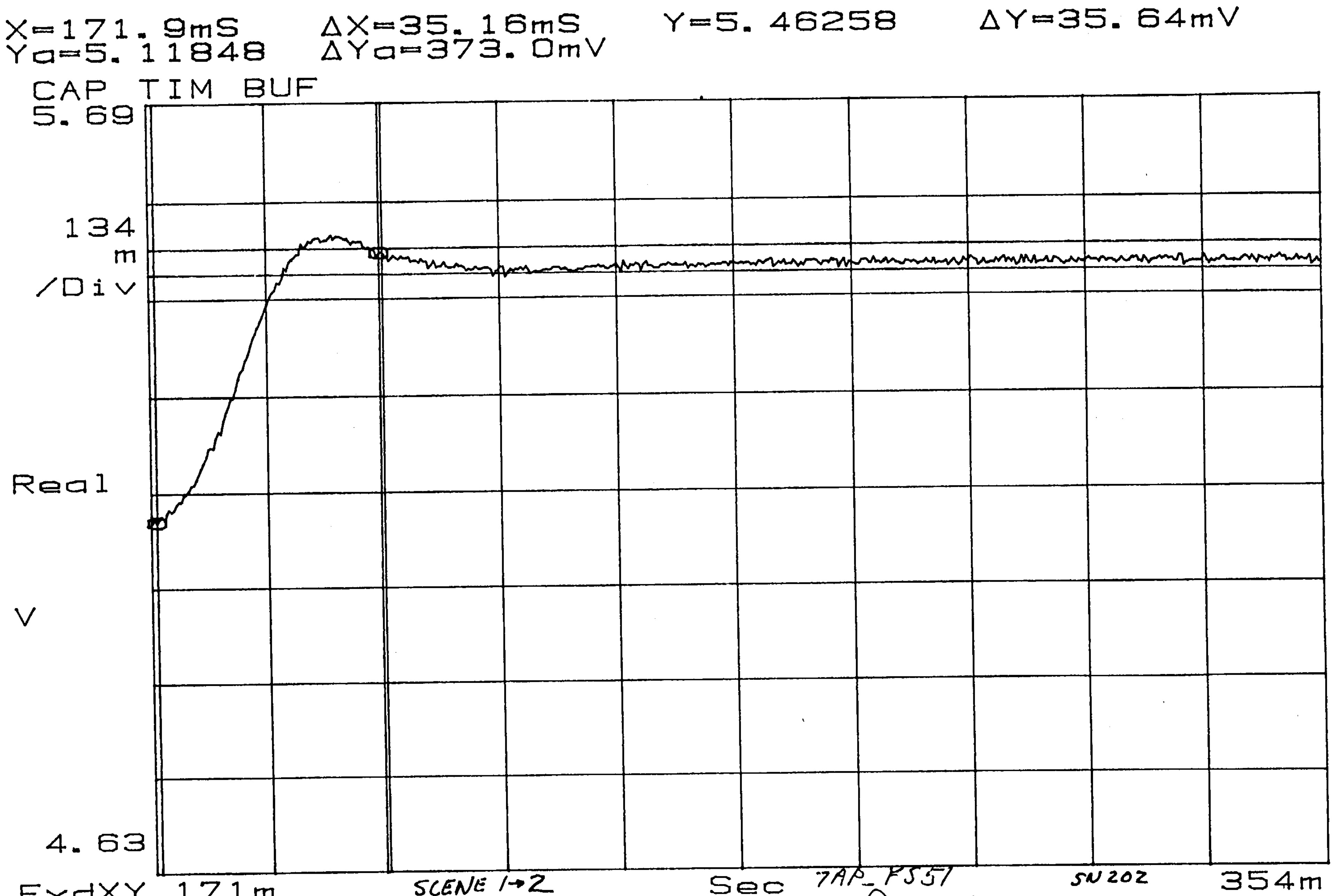
A1-1

S/O: Z98561

P/N: 1356008-1 — 1T

Test Eng: [signature] Date: 1-27-98

Quality: (74 228) 30 0.0320



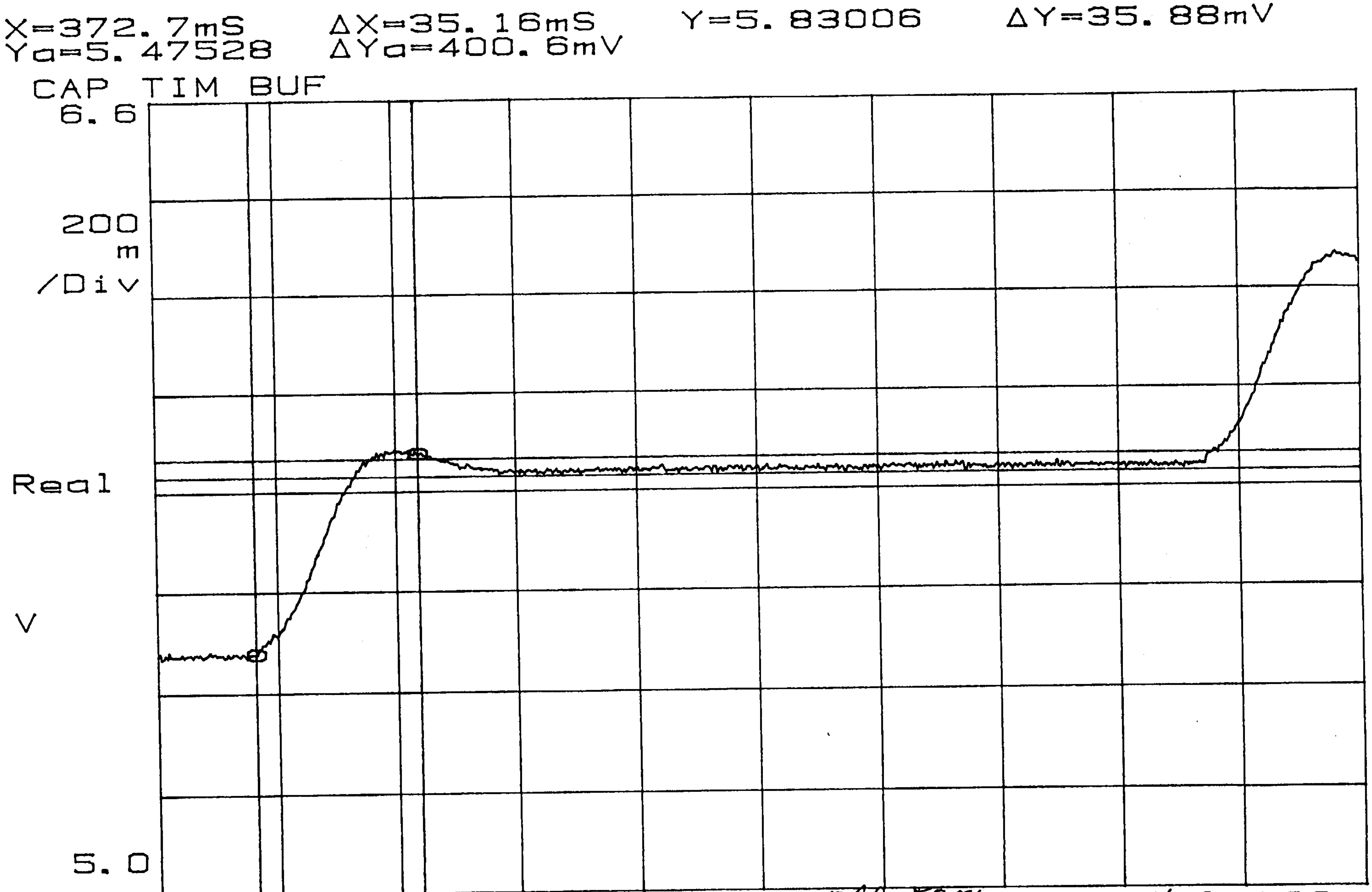
S/O: 298561
P/N: 1356008-1-1T

3.4.4.5_9
A1-1

Test Eng: Ray
Quality:

Date: 1-28-98

B2



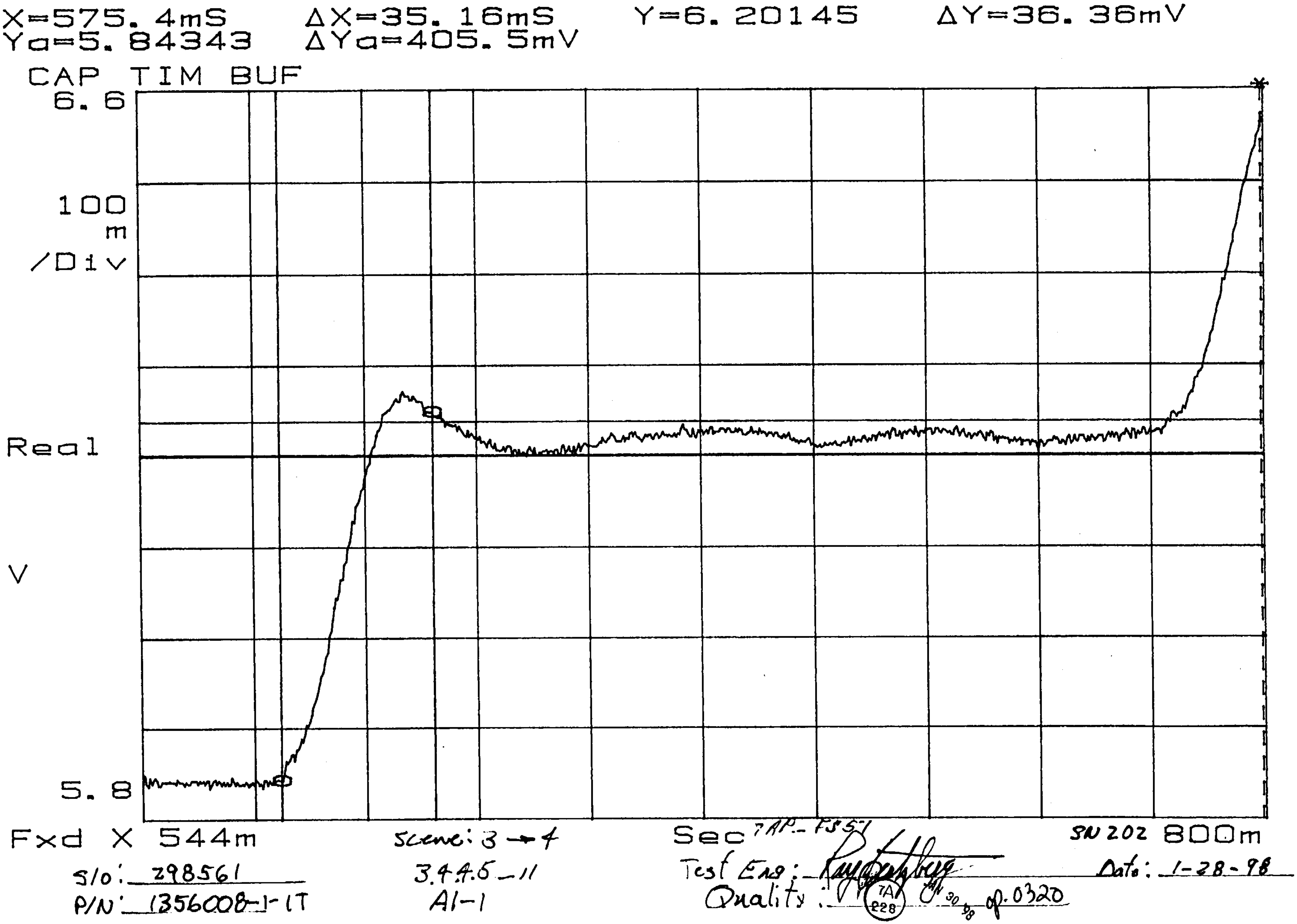
S/O: 298561
P/N: 1356008-1-1T

Scene: 2→3
3.4.4.5_10
A1-1

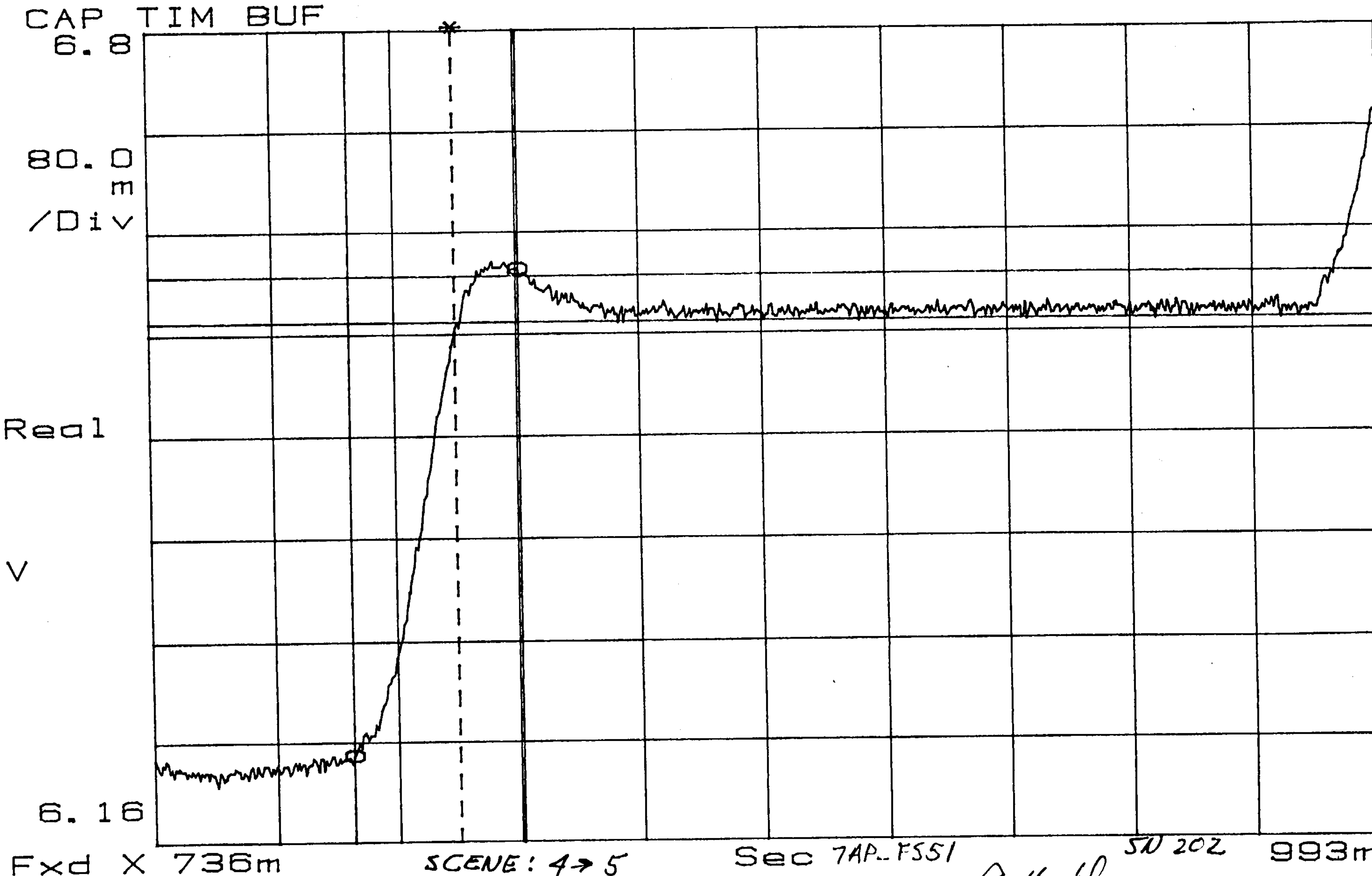
7AP_FS51
Test Eng: Ray Hertzberg
Quality: 7A 228 JAN 30 98 op.0320

SN: 202
Date: 1-28-98

83


X=575.4mS ΔX=35.16mS Y=6.20145 ΔY=36.36mV
Ya=5.84343 ΔYa=405.5mV
CAP TIM BUF
6.6
100
m
/Div
Real
V
5.8
Fxd X 544m
Sec
800m
Scene: 3 → 4
3.4.4.5 _11
A1-1
7AP-FS51
SN 202
S/O: 298561
P/N: 1356008-1-1T
Test Eng:
Quality:
7A
228
Date: 1-28-98
30 98
0320

X=777.7mS ΔX=35.55mS Y=6.56921 ΔY=36.07mV
Ya=6.22943 ΔYa=381.1mV



SCENE: 4→5 7AP_FS51 SN 202

3.4.4.5_12

A1-1

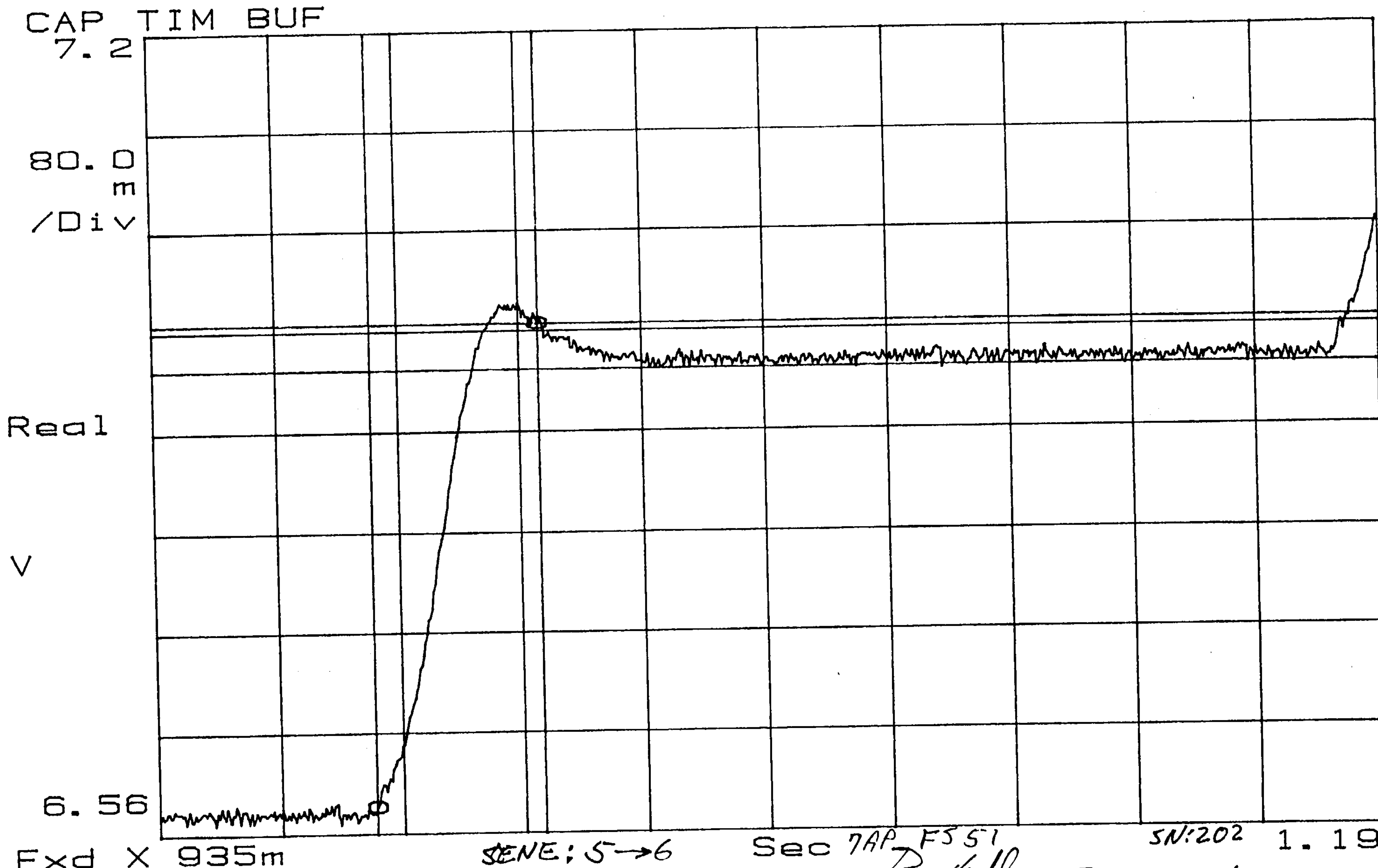
S/O: 298561

P/N: 1356008-1-1T

Test Eng: Ray Bergberg Date: 1-28-98

Quality: 7A 228 30 of 0320

X=980.9mS ΔX=35.16mS Y=6.92926 ΔY=36.07mV
Ya=6.58136 ΔYa=384.4mV



~~SE~~ENE; 5 → 6
3445–13
AI–1

7AP F5 51

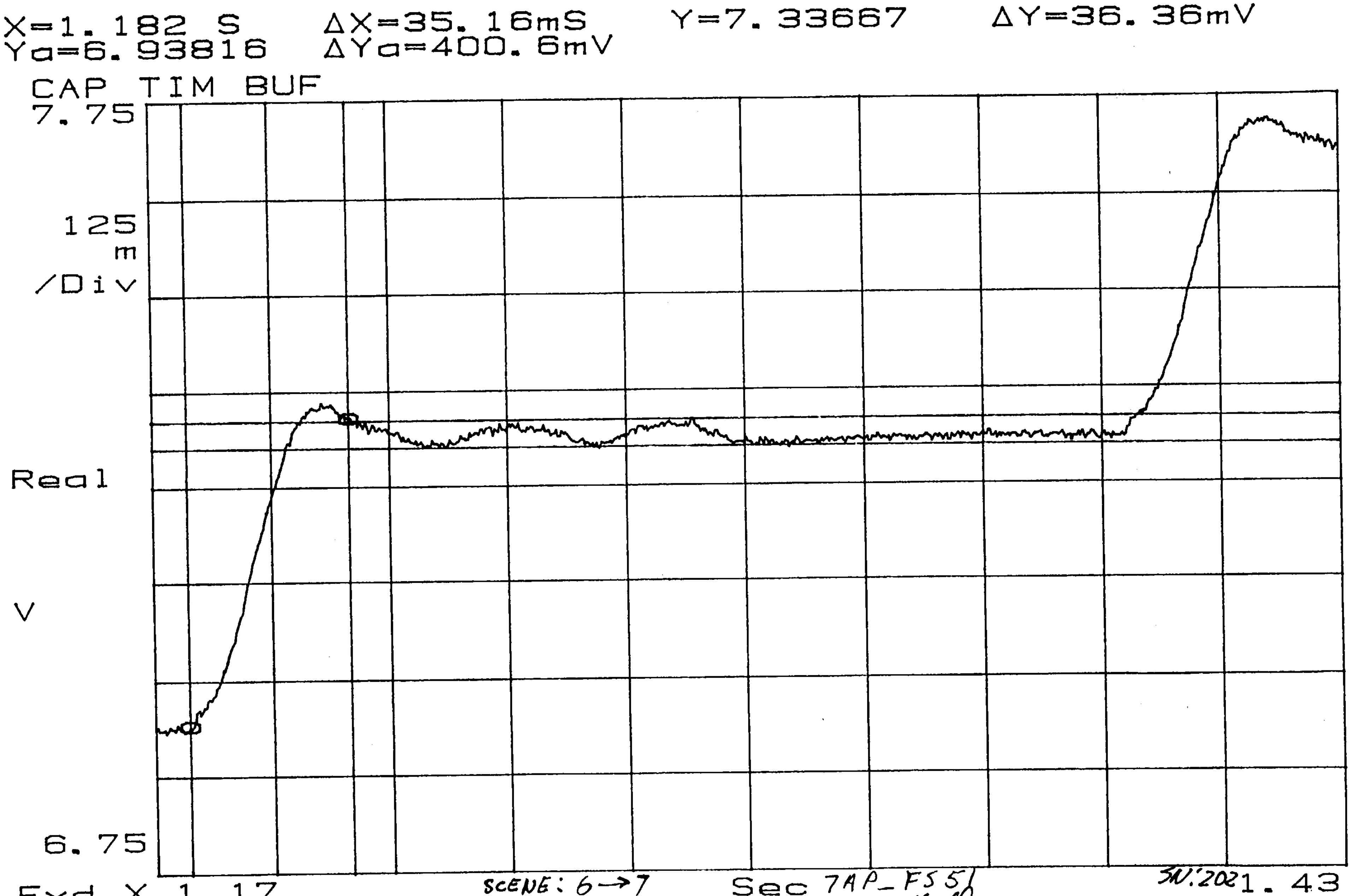
SN:202

S/O: 298561

P/N: 1356008-1-IT

Test Eng: Ray [signature] Date: 1-28-98

Quality: 7AV 228 JAN 30 98 Q-0320



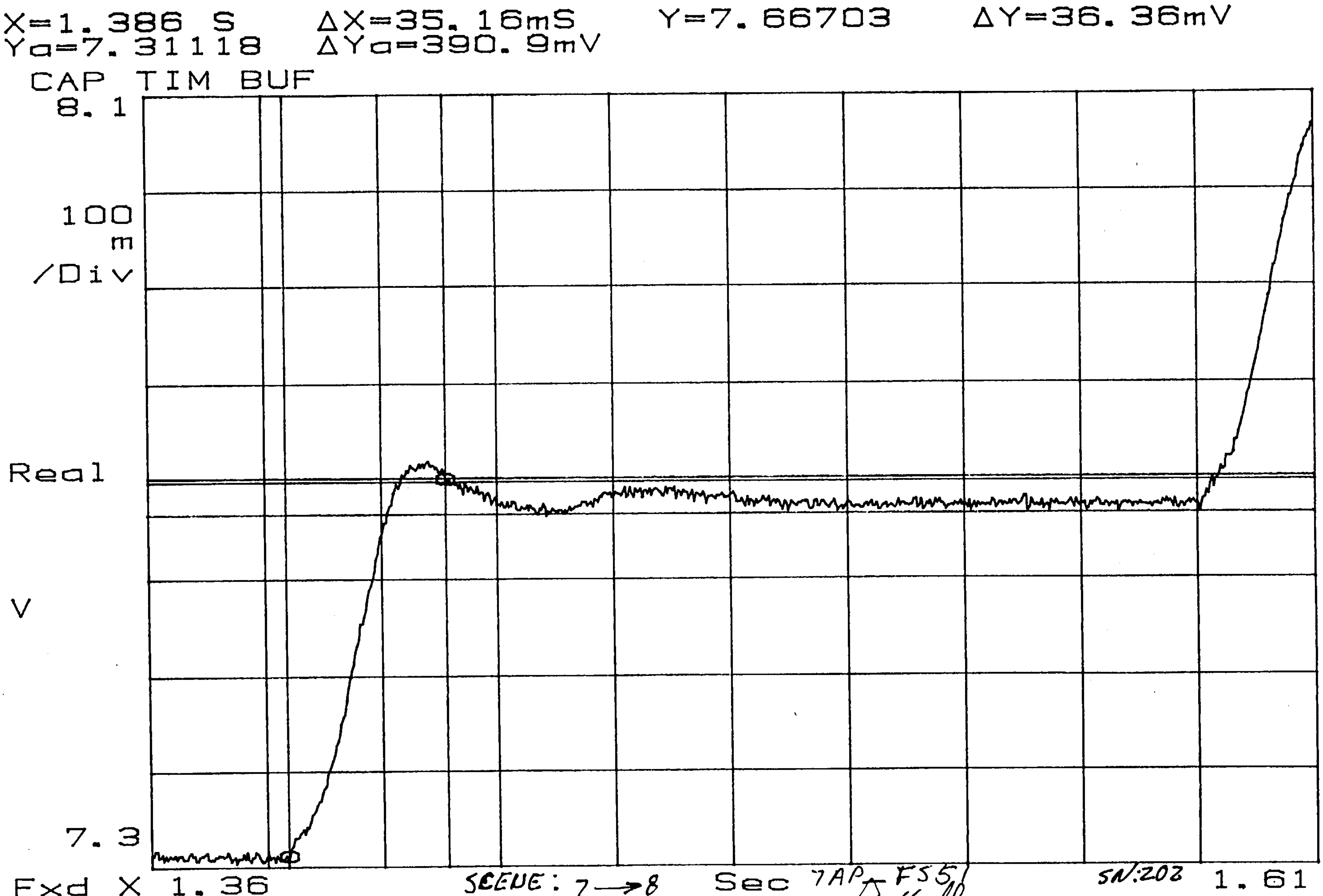
SCENE: 6→7 7AP_FS5 SN:2021

3.4.4.5_14
A1-1

S/O: 298561
P/N: 1356008-1-1T

Test Eng: Ray Herzberg Date: 1-28-98
Quality: 7A 228 JAN 30 98 OP-0320

B7



SCENE: 7 → 8
7AP-F55
SN:202

S/O: 298561
P/N: 1356008-1-1T

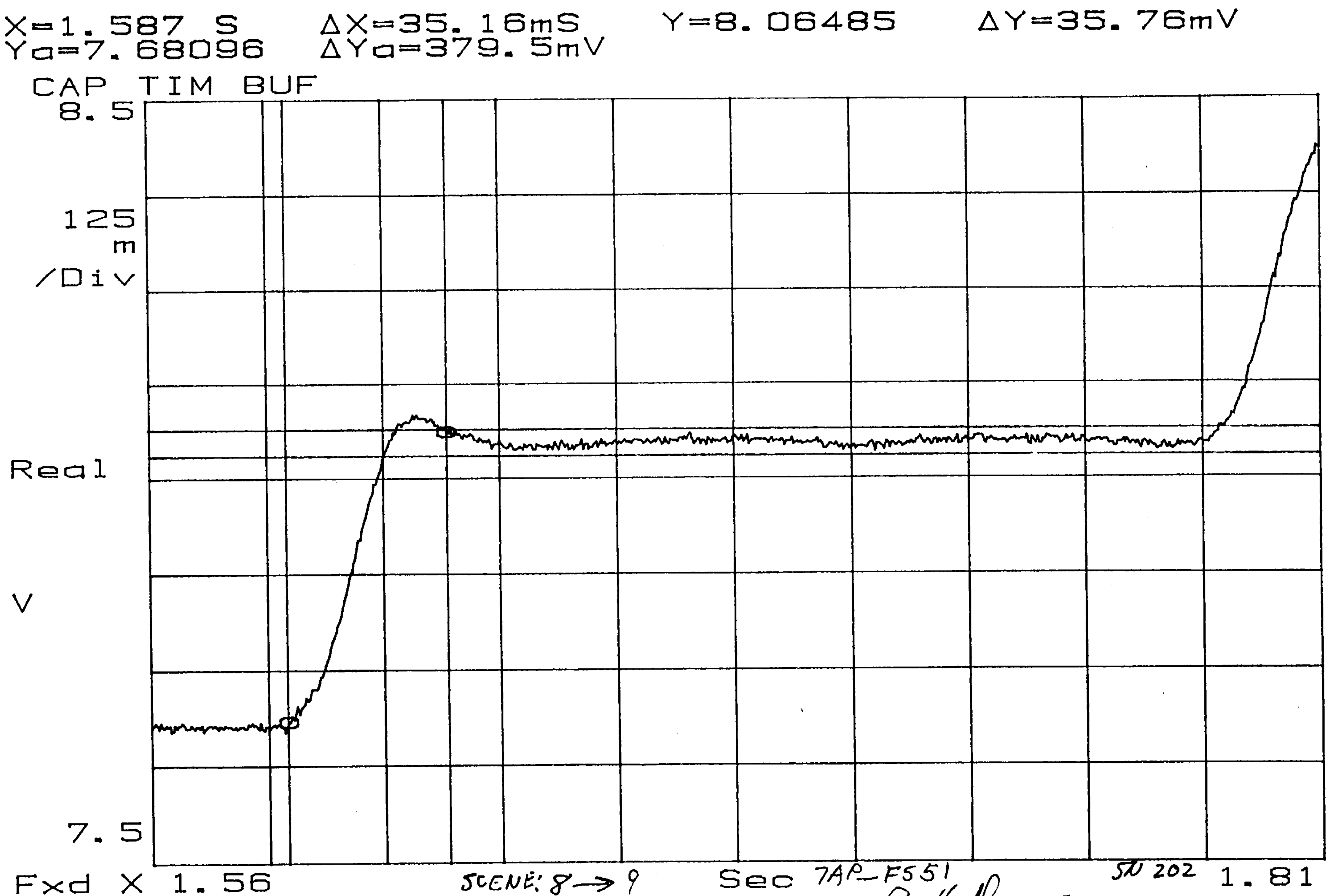
3A4.5_15
A1-1

Test Eng:
Quality:
Date: 1-28-98

7A 228

JAN 30 '98

Q.0320



SCENE: 8 → 9

Sec 7AP–F551

SN 202

S/O: 298561

3.4.4.5–16

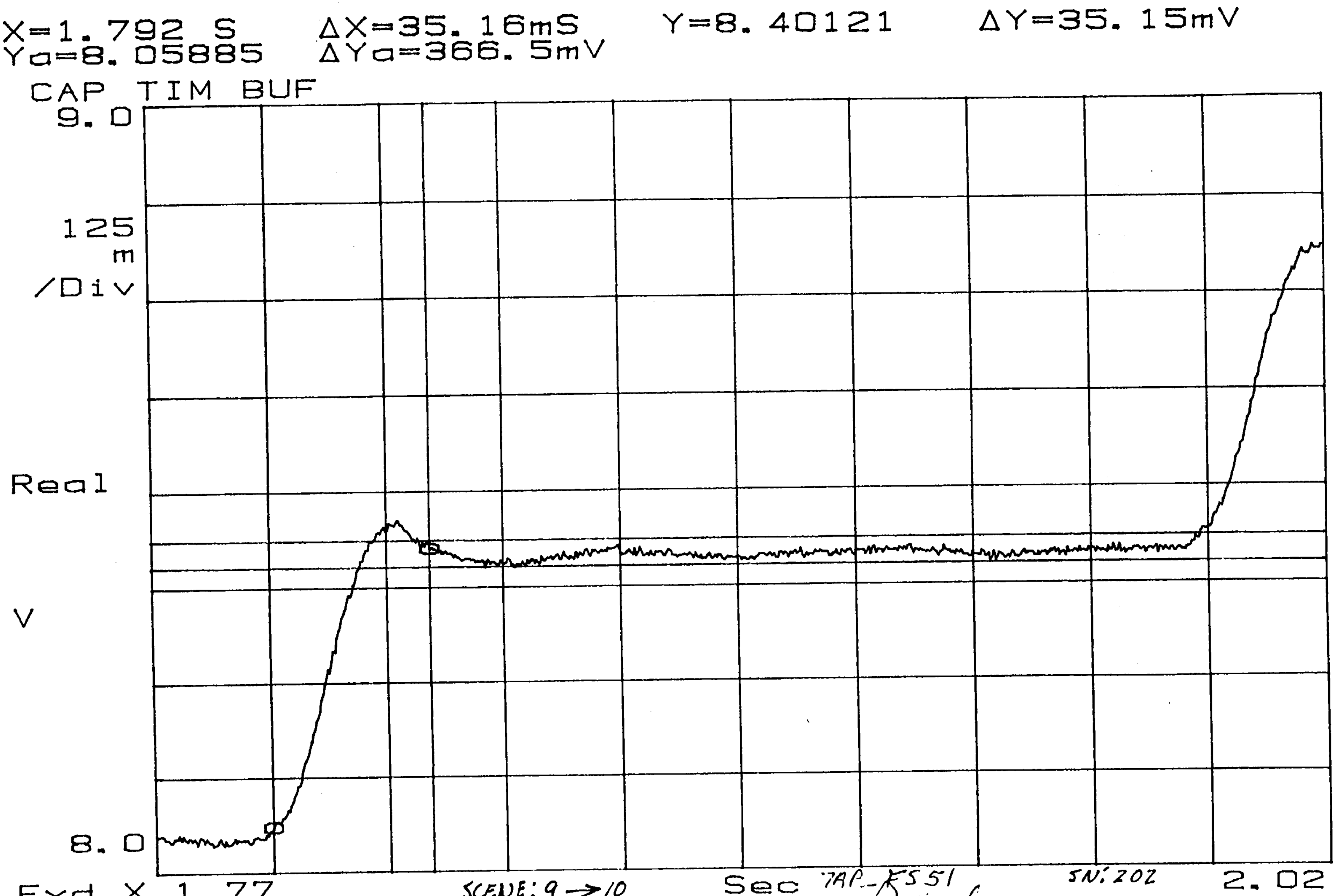
Test Eng: Ray [signature]

Date: 1-28-98

PN: 1356008-1-1T

A1-1

Quality: 7A 228 op. 0320



SCENE: 9 → 10
3.4.4.5 _17
A1-1

TAP-FS51 SN: 202

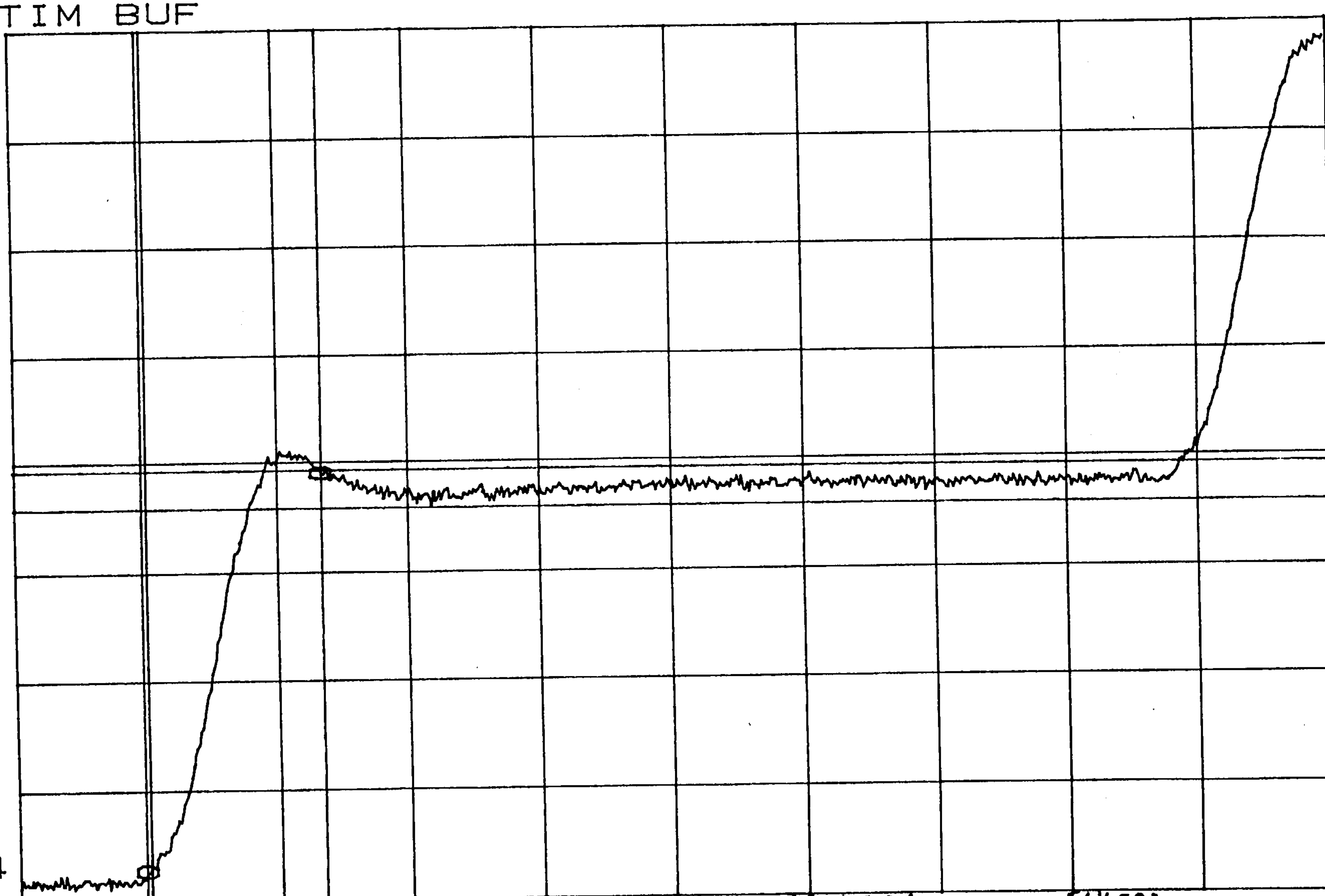
S/O: 298561

P/N: 1356008-1-1T

Test Eng: [signature] Date: 1-28-98

Quality: [stamp] Q-0320

X=1.994 S   ΔX=35.16mS   Y=8.79224   ΔY=35.88mV
Ya=8.427   ΔYa=361.7mV



SCENE: 10 → 11   7AP_FS51   SN: 202

3.4.4.5_18
A1-1

S/O: 298561
P/N: 1356008-1-LT

Test Eng: Ray Hertzberg   Date: 1-28-98
Quality: 7A 228 JAN 30 98 .0320

Bn

X=2.196 S   ΔX=35.16mS   Y=9.16691   ΔY=36.36mV
Ya=8.78704   ΔYa=392.5mV

CAP TIM BUF

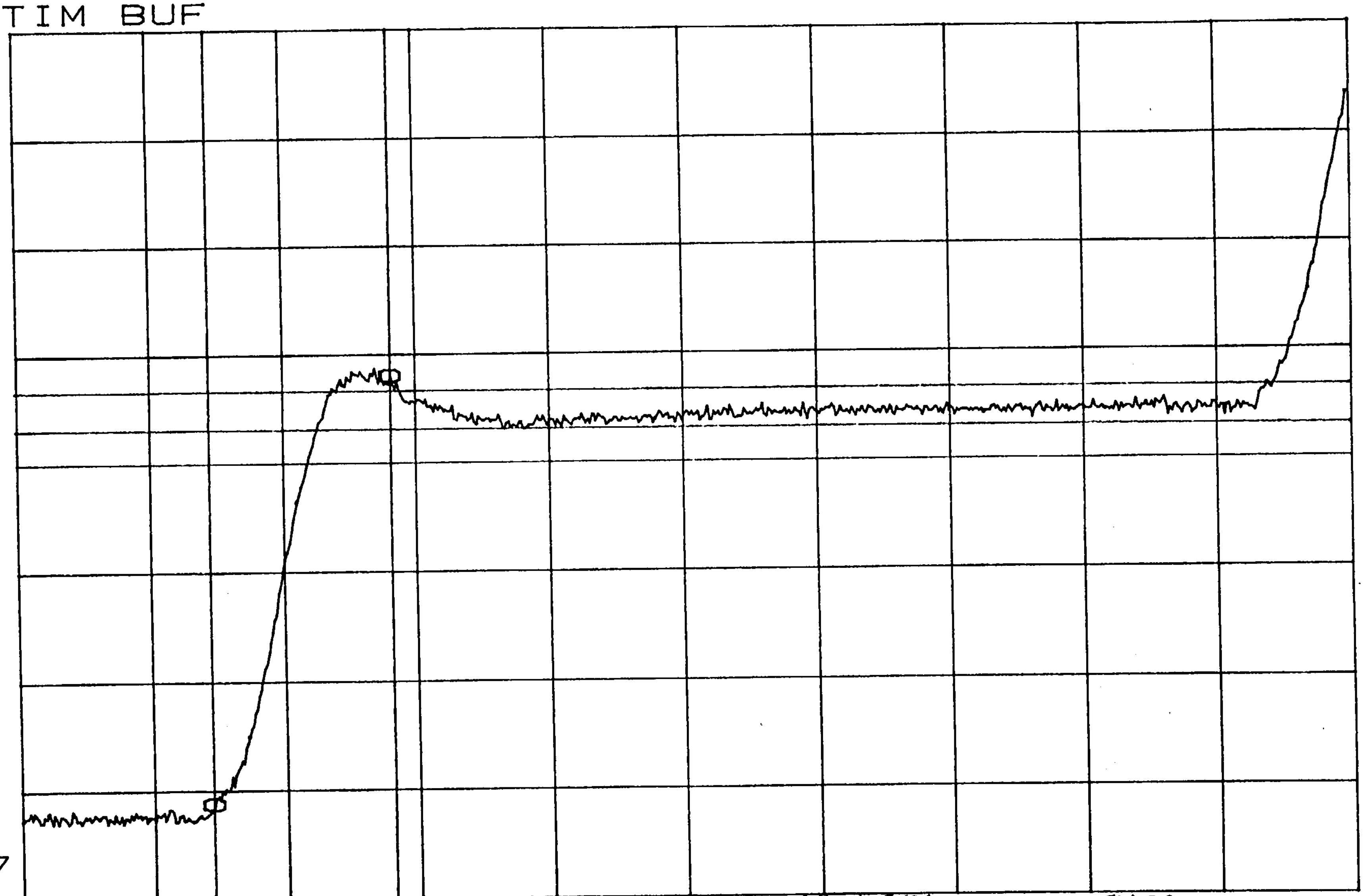
9.5

100
m
/Div

Real

V

8.7



Fxd X 2.16   Sec   2.42

SCENE: 11 → 12
3.4.4.5—19
AI-1

7AP-FSS1

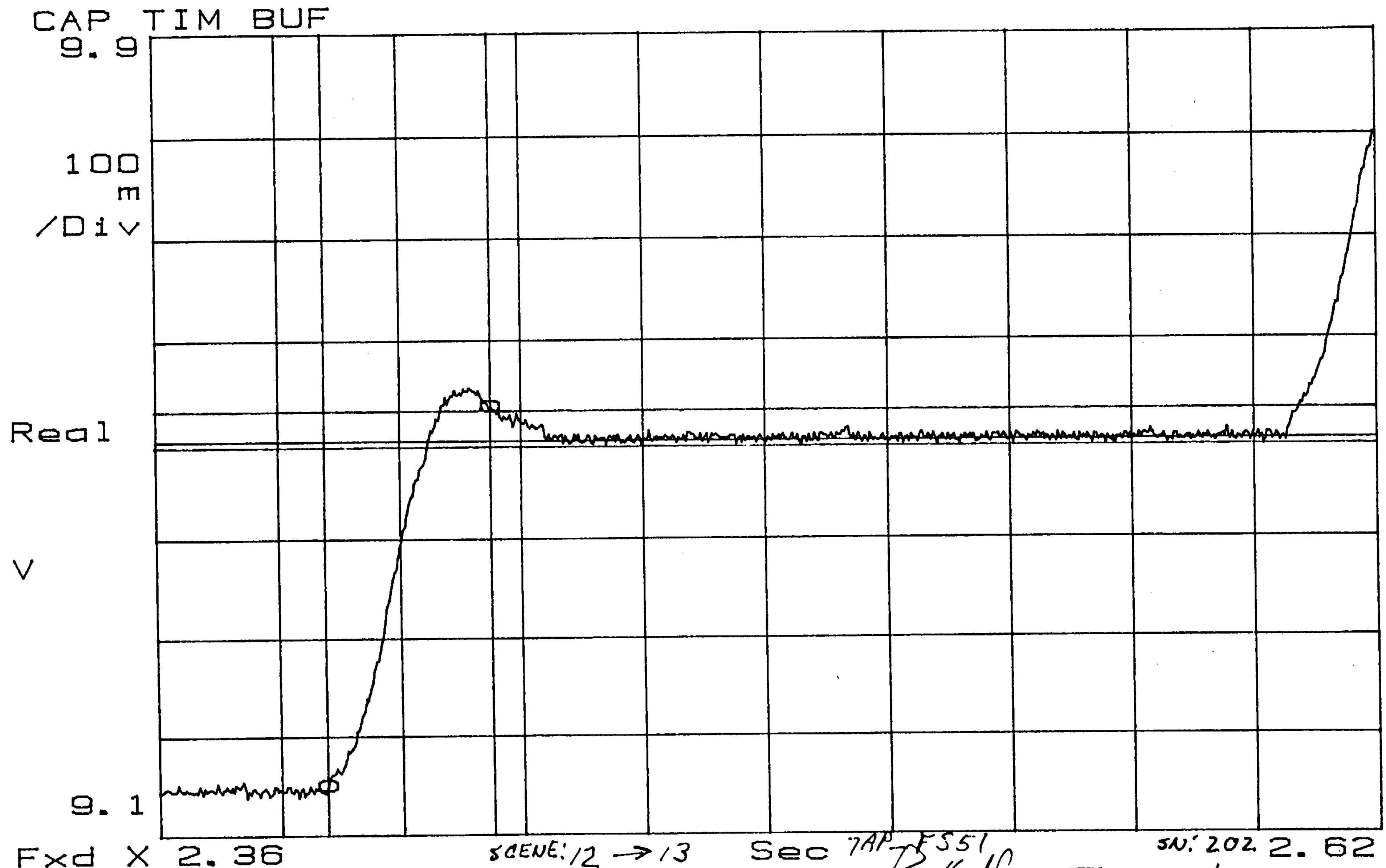
SN: 202

S/O: 298561
P/N: 1356008-1-1T

Test Eng: Ray [signature] JAN 30 98   Date: 1-28-98
Quality: 7AC 228   98-0320

B12

X=2.398 S ΔX=35.16mS Y=9.49273 ΔY=35.88mV
Ya=9.15033 ΔYa=382.8mV



SCENE: 12 → 13 TAP-FS51 SN: 202

S/O: 298561 3.4.4.6 _ 20 Test Eng: Ray Berzberg Date: 1-28-98

P/N: 1356008-1-1T K1-1 Quality: 228 JAN 30 98 op. 0320

B13

X=2.601 S ΔX=35.16mS Y=9.8606 ΔY=35.88mV
Ya=9.50713 ΔYa=397.3mV

CAP TIM BUF

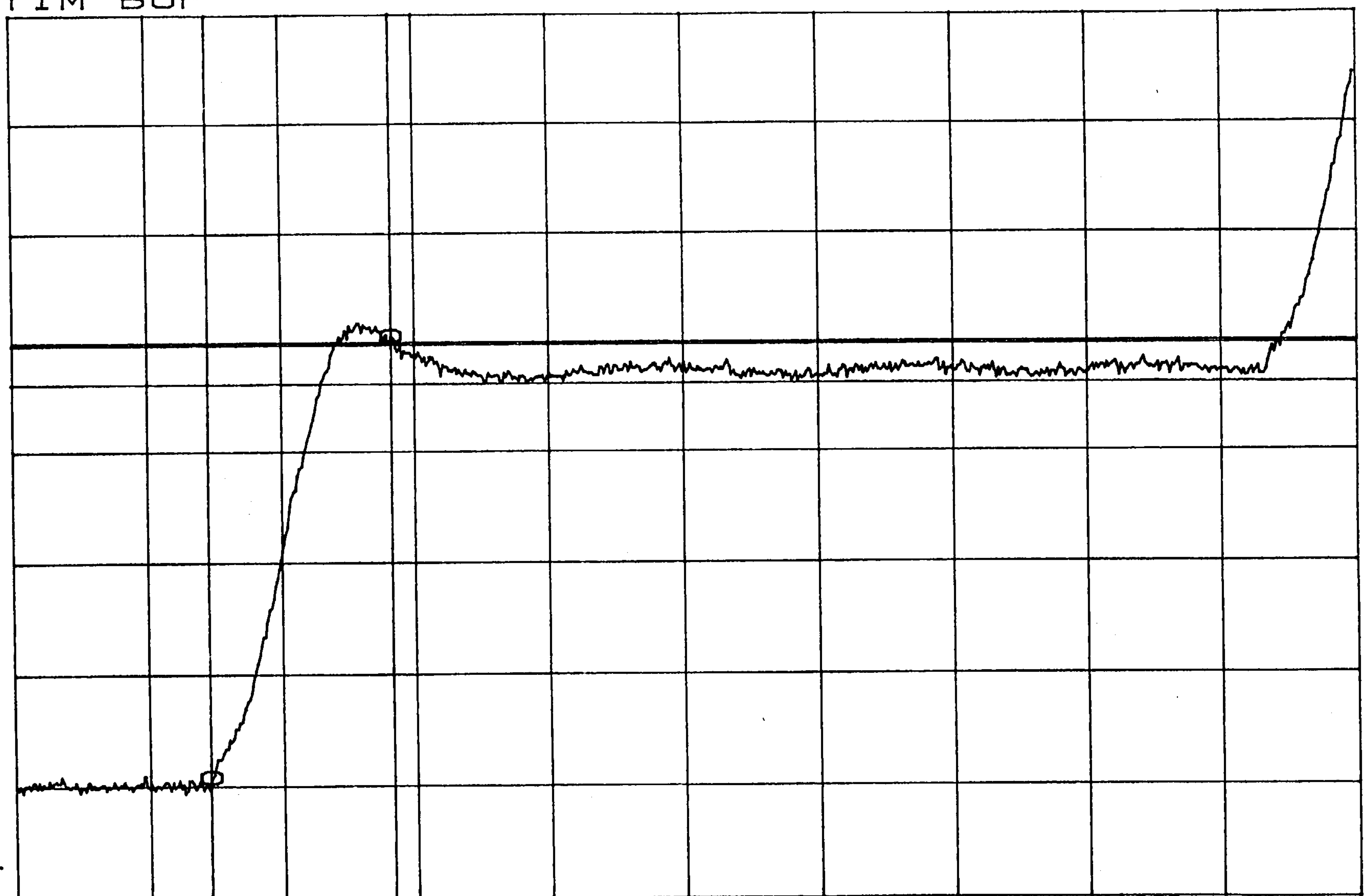
10.2

100
m
/Div

Real

V

9.4



Fxd X 2.56 2.82

SCENE: 13 → 14

Sec 7AR-FS 51

SN: 202

S/O: 298561

3.4.4.5-21

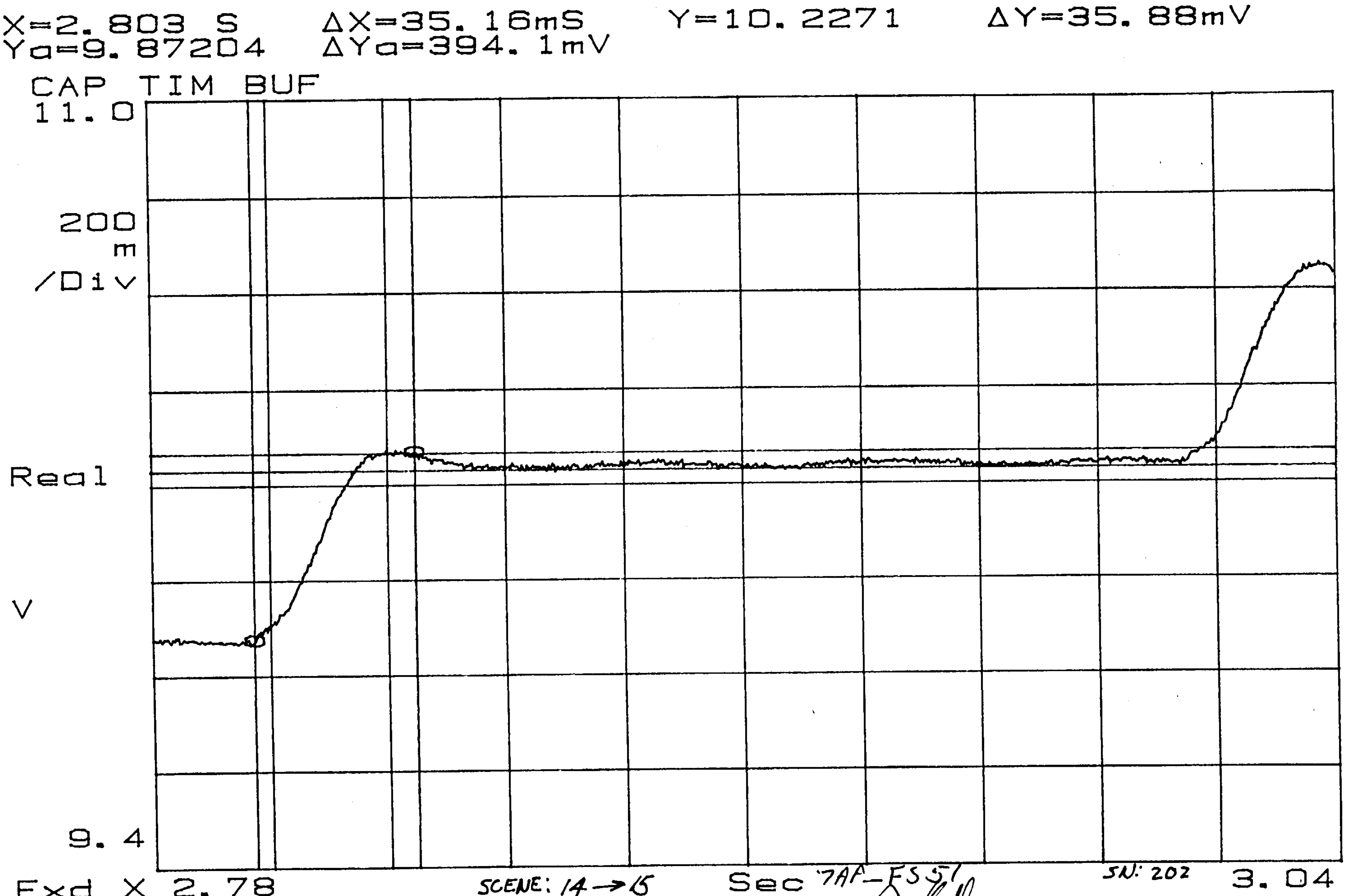
Test Eng: Ray Bergberg

Date: 1-28-98

P/N: 1356008-1-1T

A1-1

Quality: 7A 228 op-0320



SCENE: 14 → 15

7AF_FS51

SN: 202

S/O: 298561

P/N: 135600B-1-1T

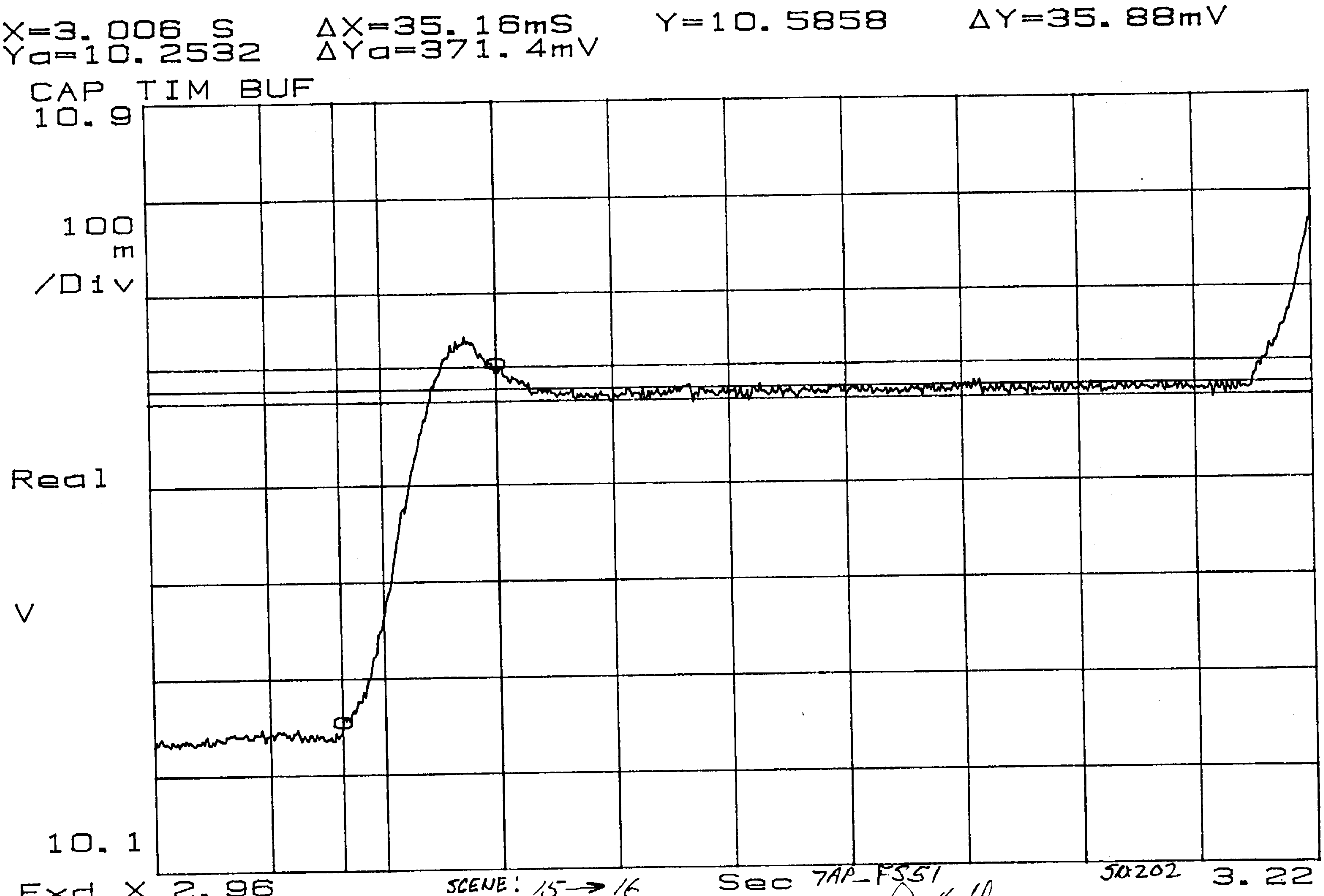
3.4.4.5 _ 22

AI-1

Test Eng: [signature] Date: 1-28-98

Quality: [signature] JAN 30 98 QA 028 op 0320

B15



SCENE: 15 → 16

7AP_F551

50202

S/O: 298561

P/N: 135600B-1-LT

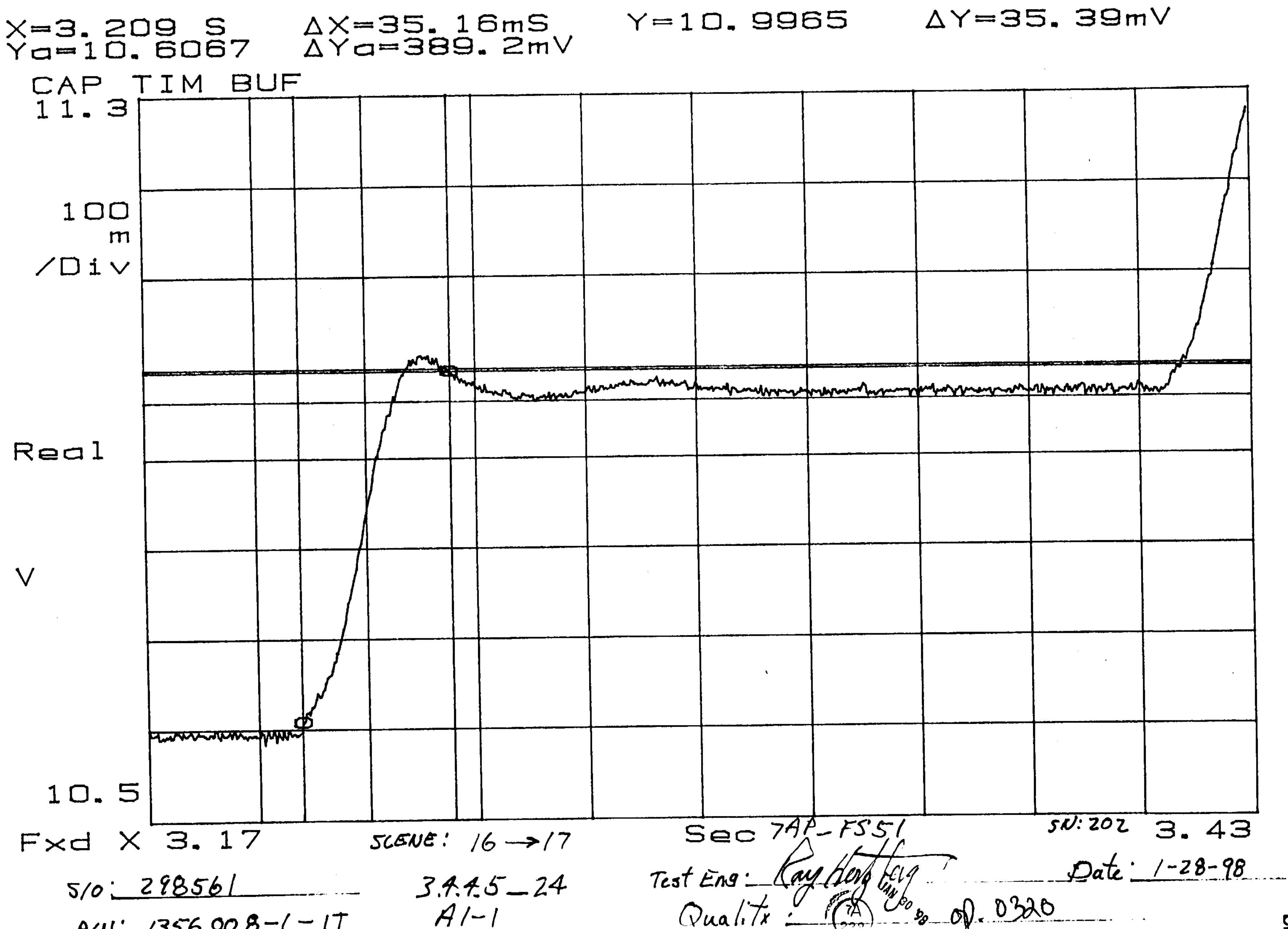
3.4.4.5_23
A1-1

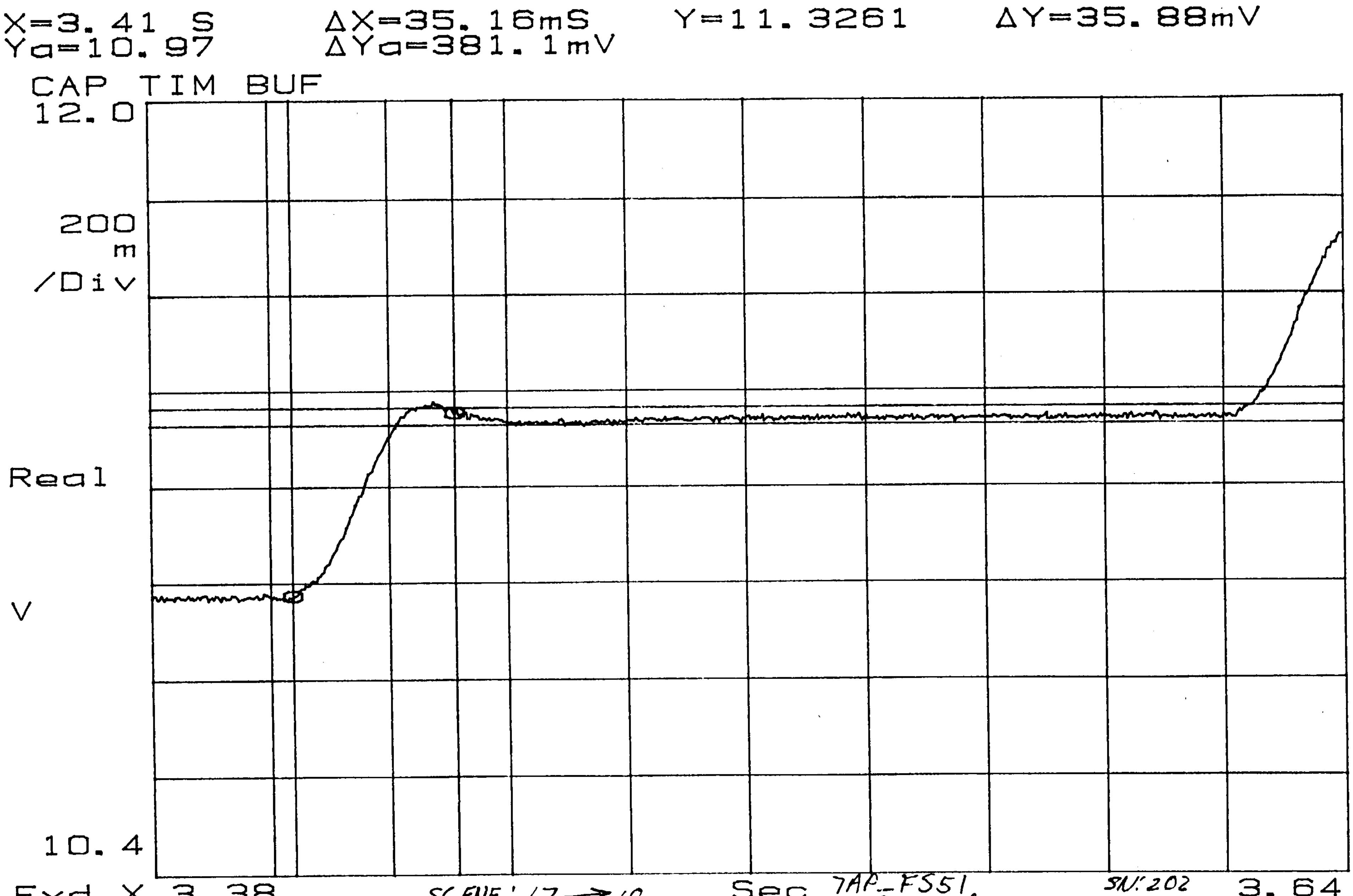
Test Engineer: Ray Hufberg

Quality: 7A 223 Op. 0320

Date: 1-28-98

B16


X=3.209 S
Ya=10.6067
ΔX=35.16mS
ΔYa=389.2mV
Y=10.9965
ΔY=35.39mV
CAP TIM BUF
11.3
100
m
/Div
Real
V
10.5
Fxd X 3.17
SCENE: 16→17
Sec 7AP-FS51
SN: 202
3.43
S/O: 298561
3.4.4.5 _ 24
A1-1
P/N: 1356008-1-1T
Test Eng: Ray Hong
Date: 1-28-98
Quality: Q. 0320
B17

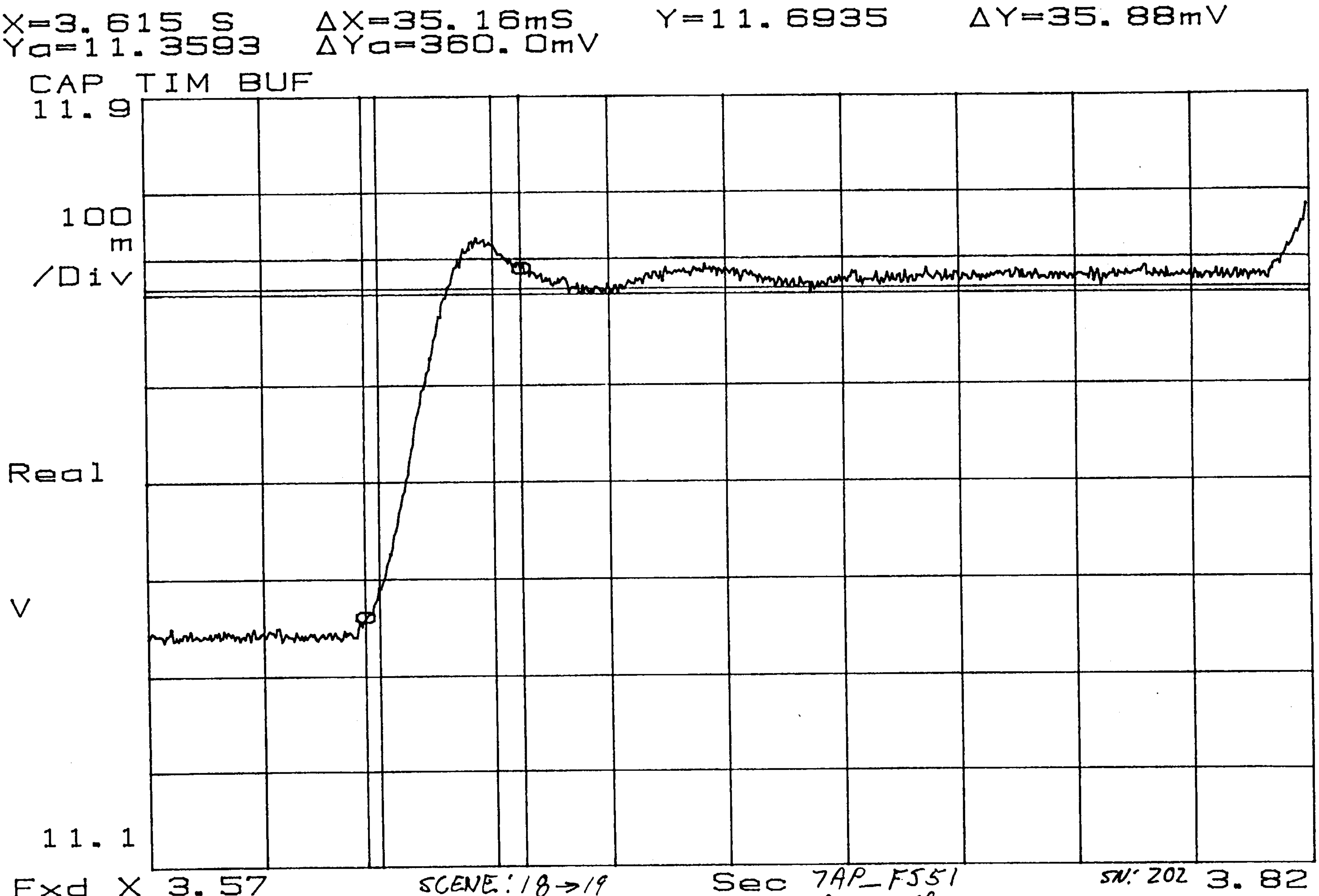


SCENE: 17 → 18 7AP_FS51 S/N: 202

S/O: 298561 3.4.4.5 — 25 Test Eng: [signature] Date: 1-28-98

P/N: 1356008-1-17 A1-1 Quality: 7AC 229 JAN 98 08.0320

B18



SCENE: 18→19

7AP_F551

SN: 202

S/O: 298561

3.4.4.5_26

Test Eng: Ray [signature]

Date: 1-28-98

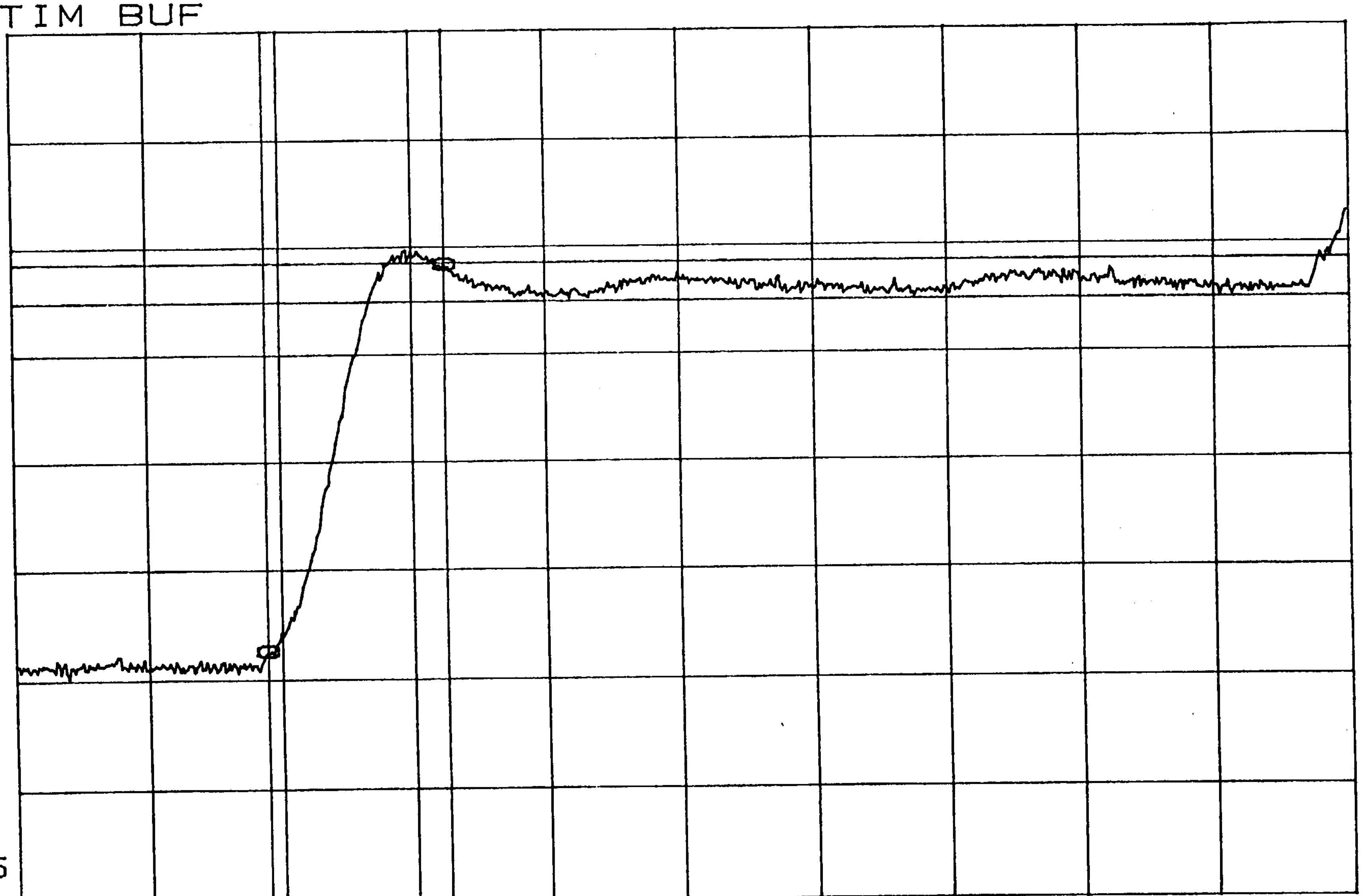
P/N: 1356008-1-1T

A/-1

Quality: 7A 228 op.0320

B19

X=3.817 S ΔX=34.77mS Y=12.0484 ΔY=35.88mV
Ya=11.7242 ΔYa=358.4mV
CAP TIM BUF



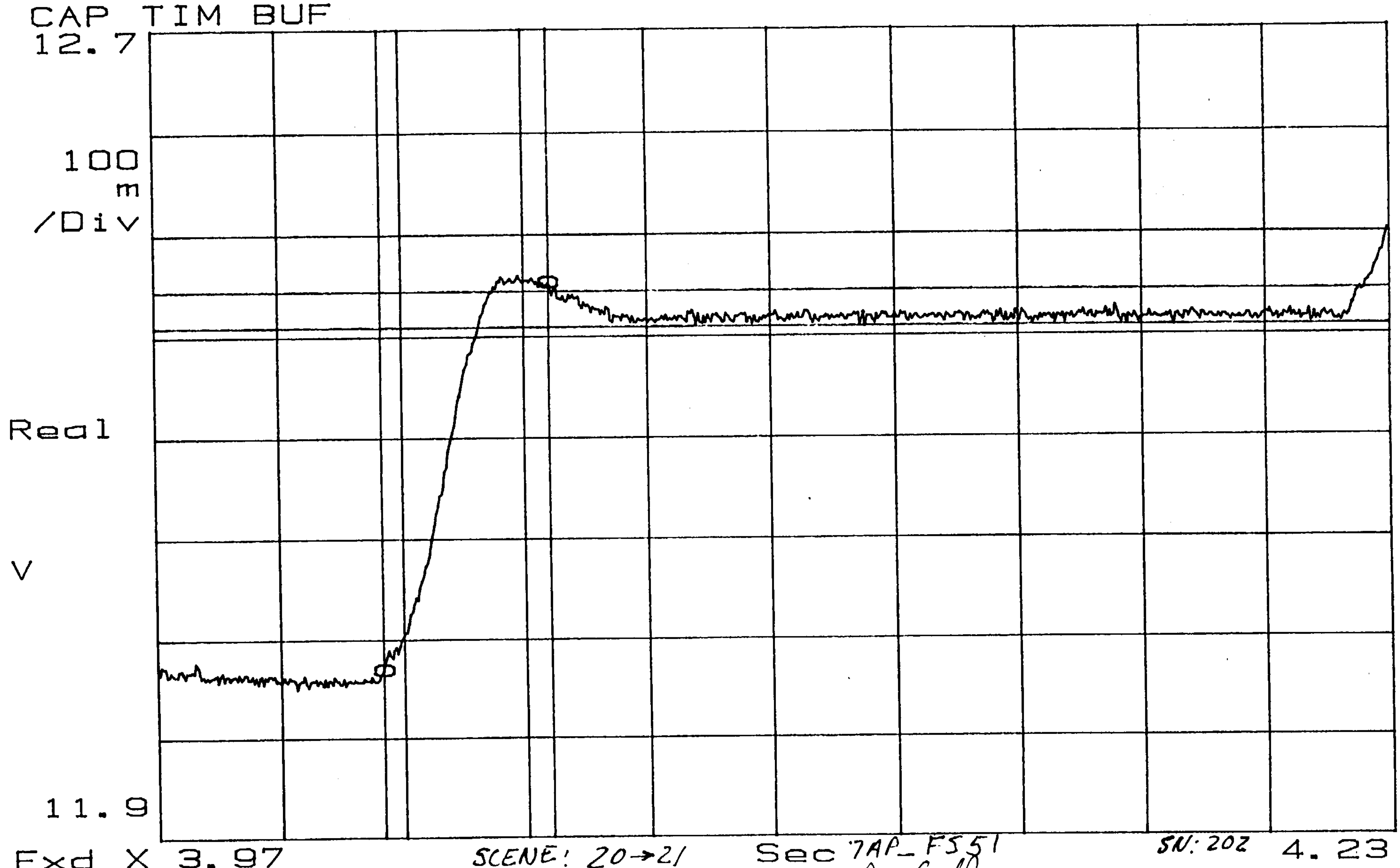
SCENE: 19 → 20 Sec 7AP_FS51 SN: 203

S/O: 298561 344.5 _ 27 Test Eng: Ray [signature] Date: 1-28-98

P/N: 1356008-1-LT AI-1 Quality: Q.0320

B20

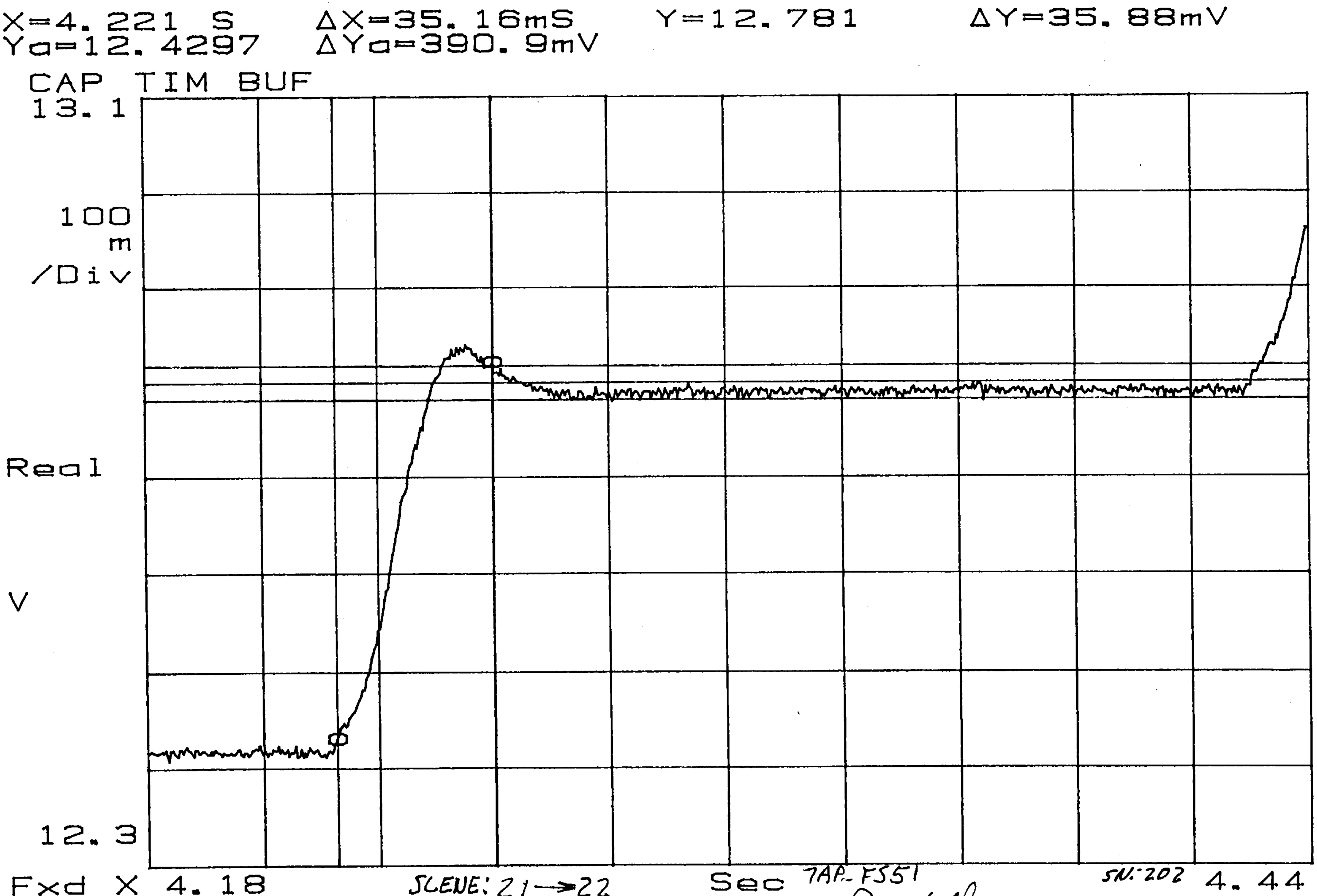
X=4.019 S ΔX=35.16mS Y=12.4081 ΔY=35.88mV
Ya=12.068 ΔYa=384.4mV



SCENE: 20→21 Sec 7AP_FS51 SN: 202

S/O: 298561 344.5 — 28 Test Eng: Ray Kuppberg Date: 1-28-98

P/N: 1356008-1-1T AI-1 Quality: 228 op. 0326

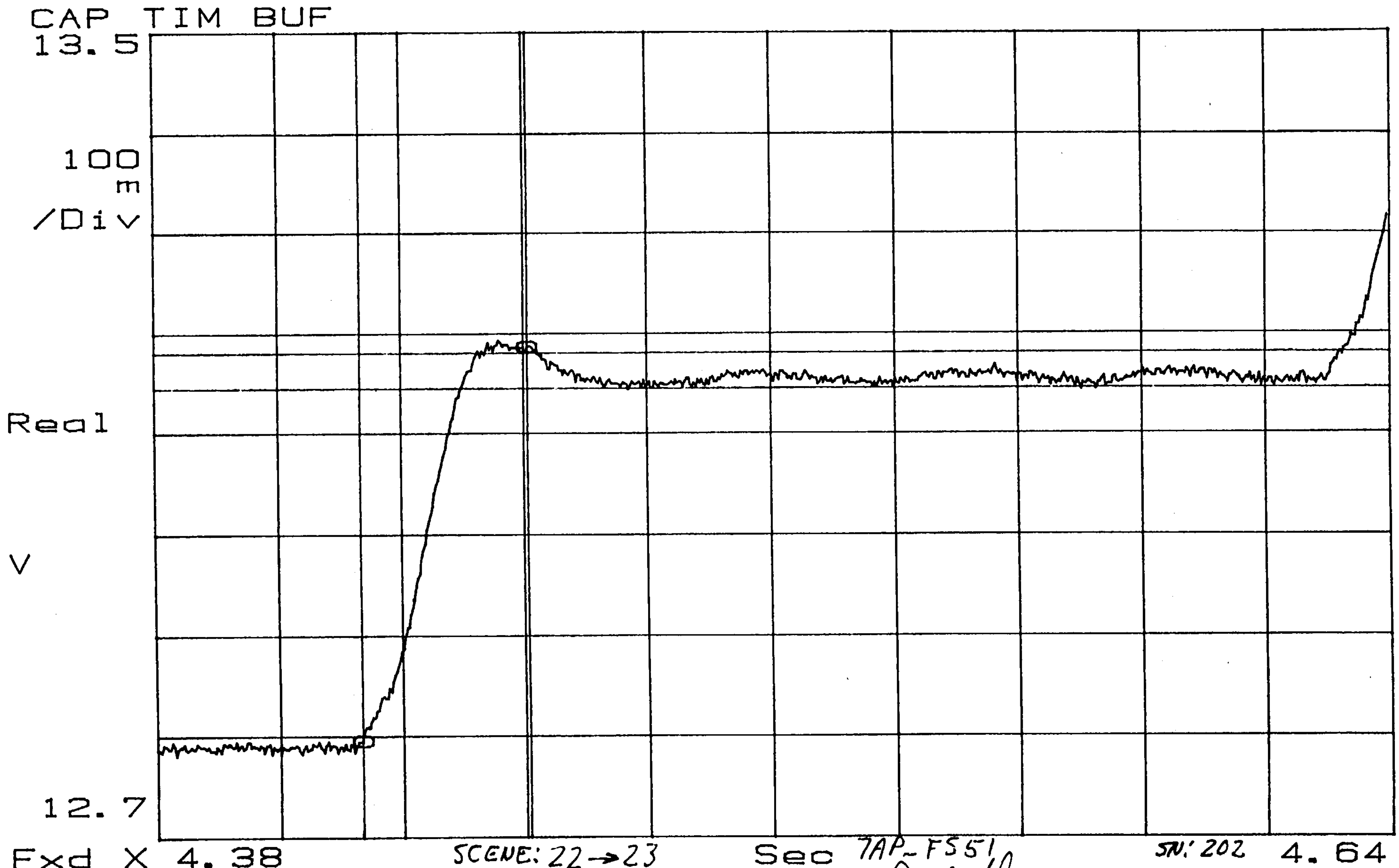


SCENE: 21 → 22 TAP-FS51 SN: 202

S/O: 298561 3.4.4.5 _ 29 Test Eng: Ray [signature] Date: 1-28-98

P/N: 1356008-1-LT A1-1 Quality: 7A 229 JAN 30 OP-0320

X=4.423 S ΔX=35.16mS Y=13.1441 ΔY=35.39mV
Ya=12.7946 ΔYa=390.9mV

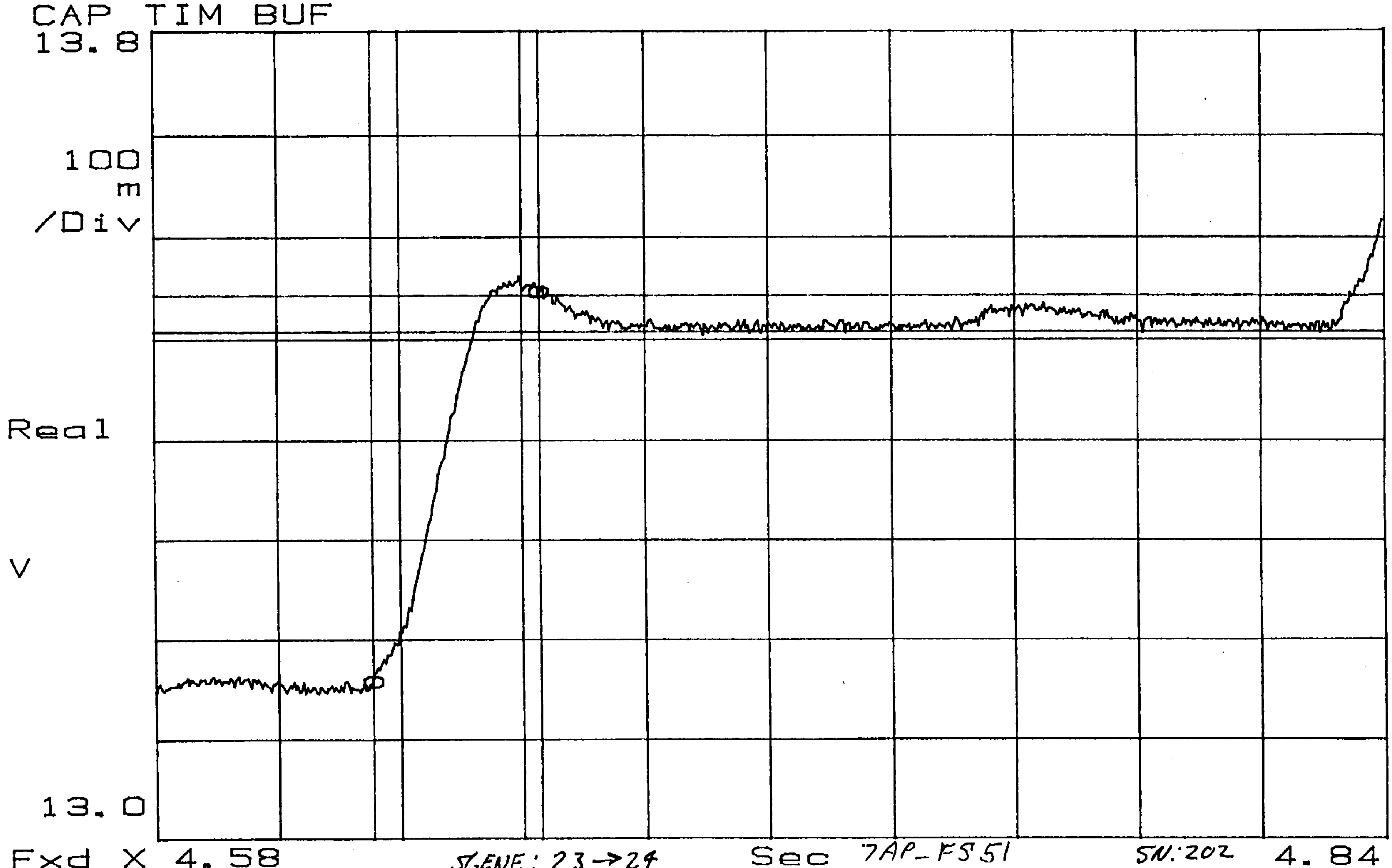


SCENE: 22→23
7AP_FS51
SN: 202

S/O: 298561 3.4.4.5 _ 30
Test Eng: Ray Herzberg Date 1-28-98
P/N: 1356008-1-1T Al-1
Quality: TI 228 JAN 30 '98 QP-0320

B23

X=4.625 S ΔX=35.16mS Y=13.5071 ΔY=35.88mV
Ya=13.1579 ΔYa=387.6mV

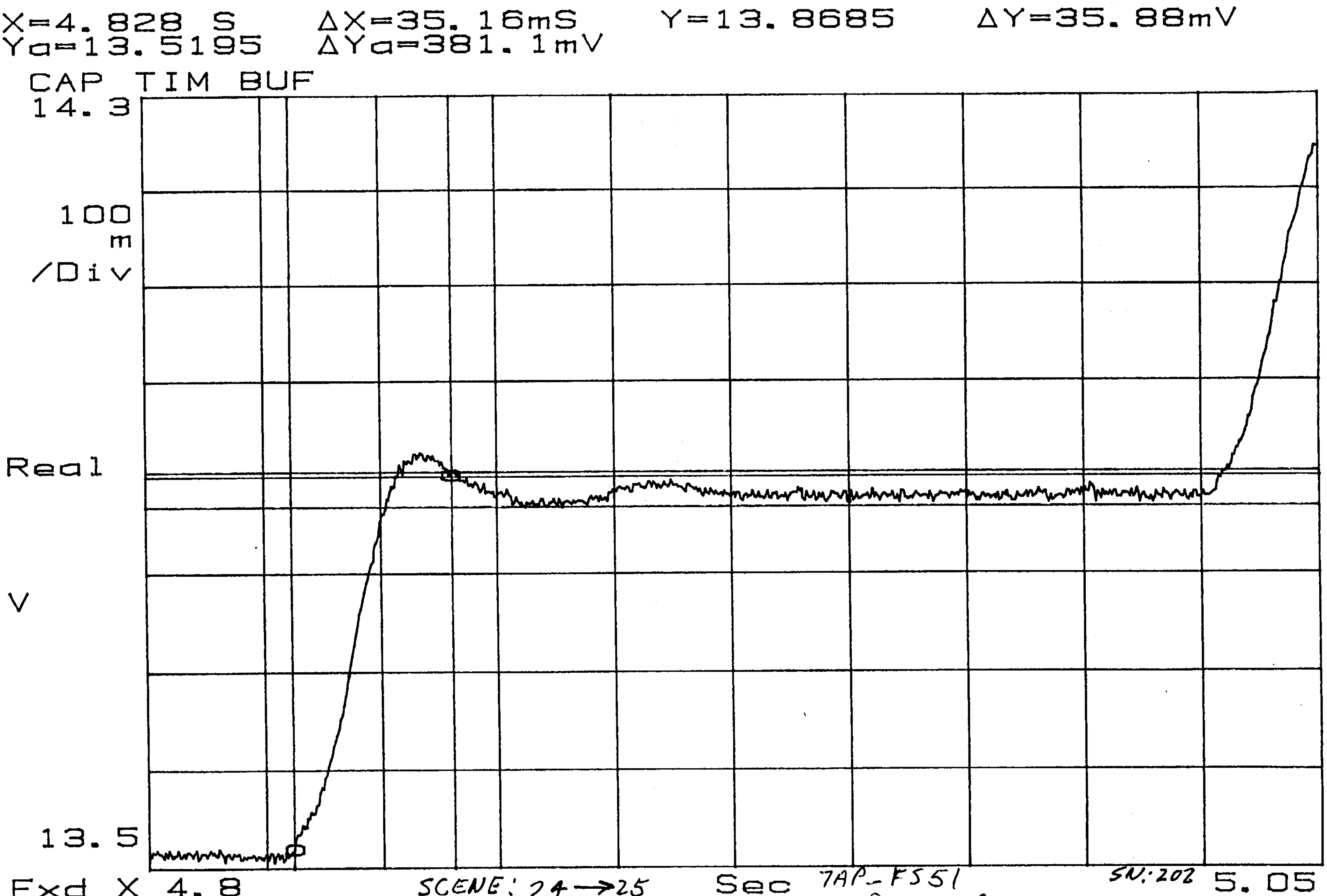


SCENE: 23→24 7AP_FS51 SN:202

S/0: 298561 3.4.4.5_31 Test Eng: Ray Herzberg Date: 1-28-98

P/N: 1356.00B-1-1T AI-1 Quality: QP.0320

B24

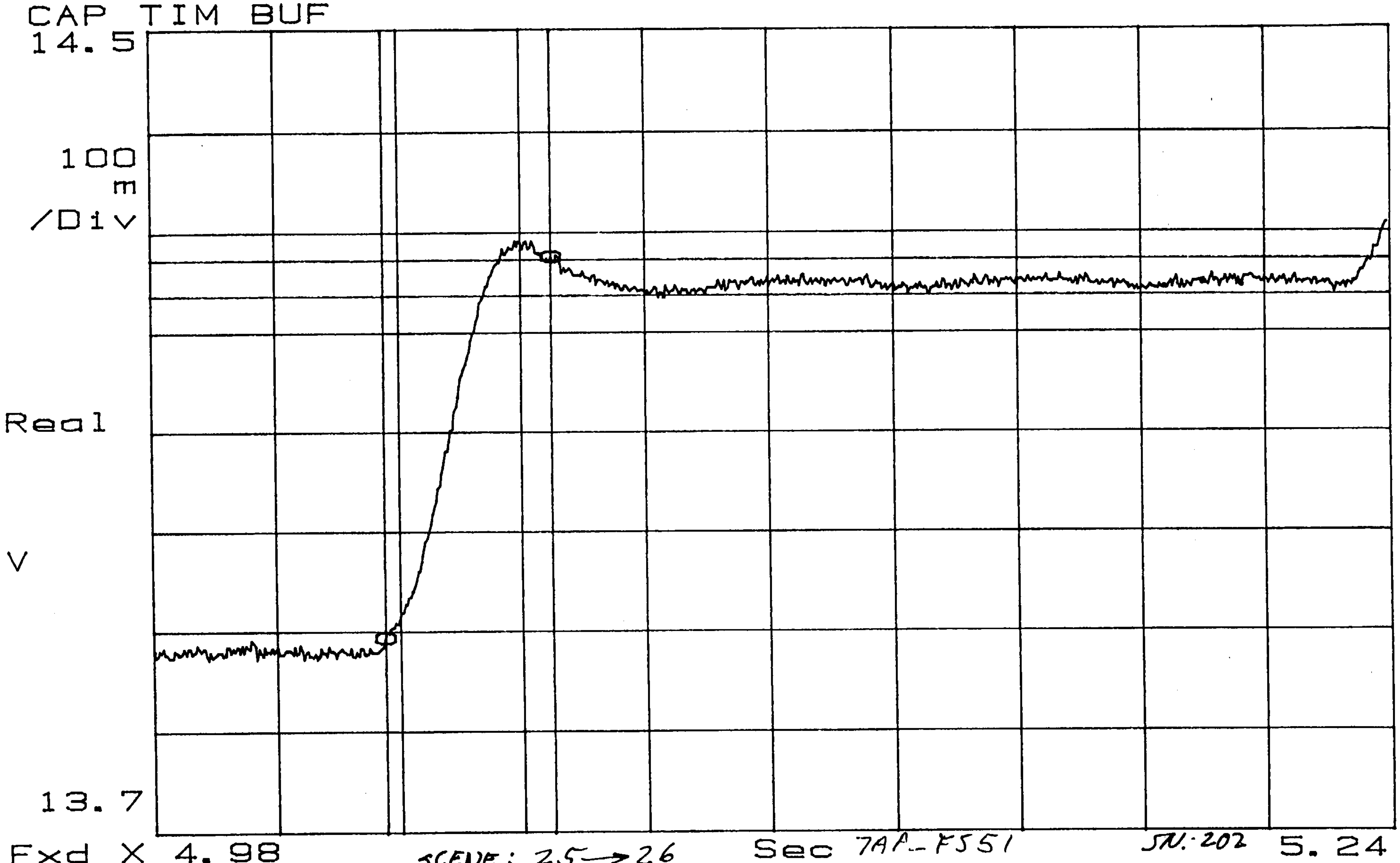


S/O: 298561
P/N: 1356008-1-7T

3.4.4.5_32
A/-1

Test Eng: Ray Bergberg Date: 1-28-98
Quality: 0320

X=5.031 S ΔX=35.16mS Y=14.2367 ΔY=35.88mV
Ya=13.8925 ΔYa=382.8mV



SCENE: 25 → 26

7AP-F551

SN: 202

S/O: 298561

P/N: 135600B-1-1T

39.4.5-33

A1-1

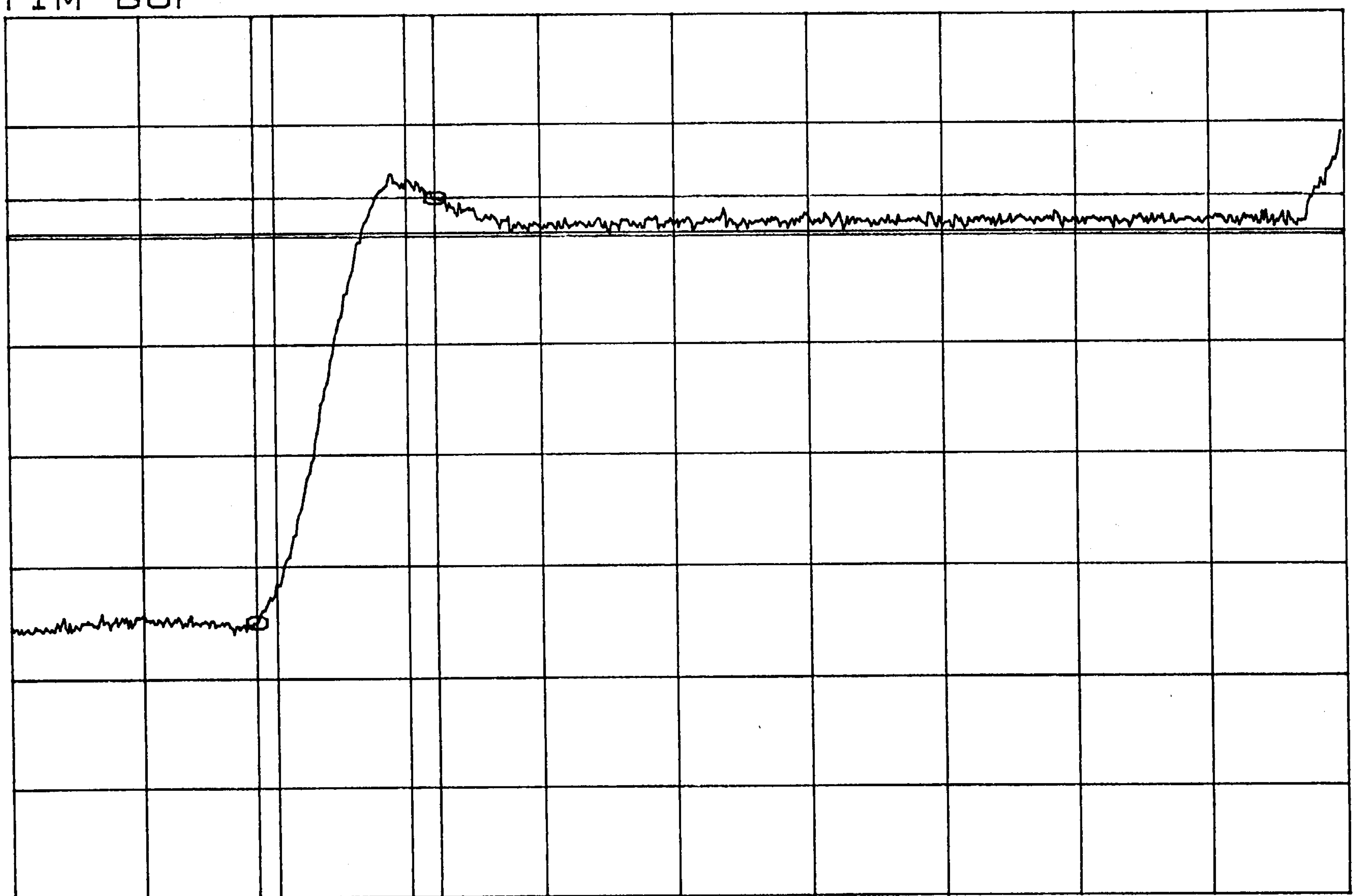
Test Eng: [signature]

Date: 1-28-98

Quality: Q.0320

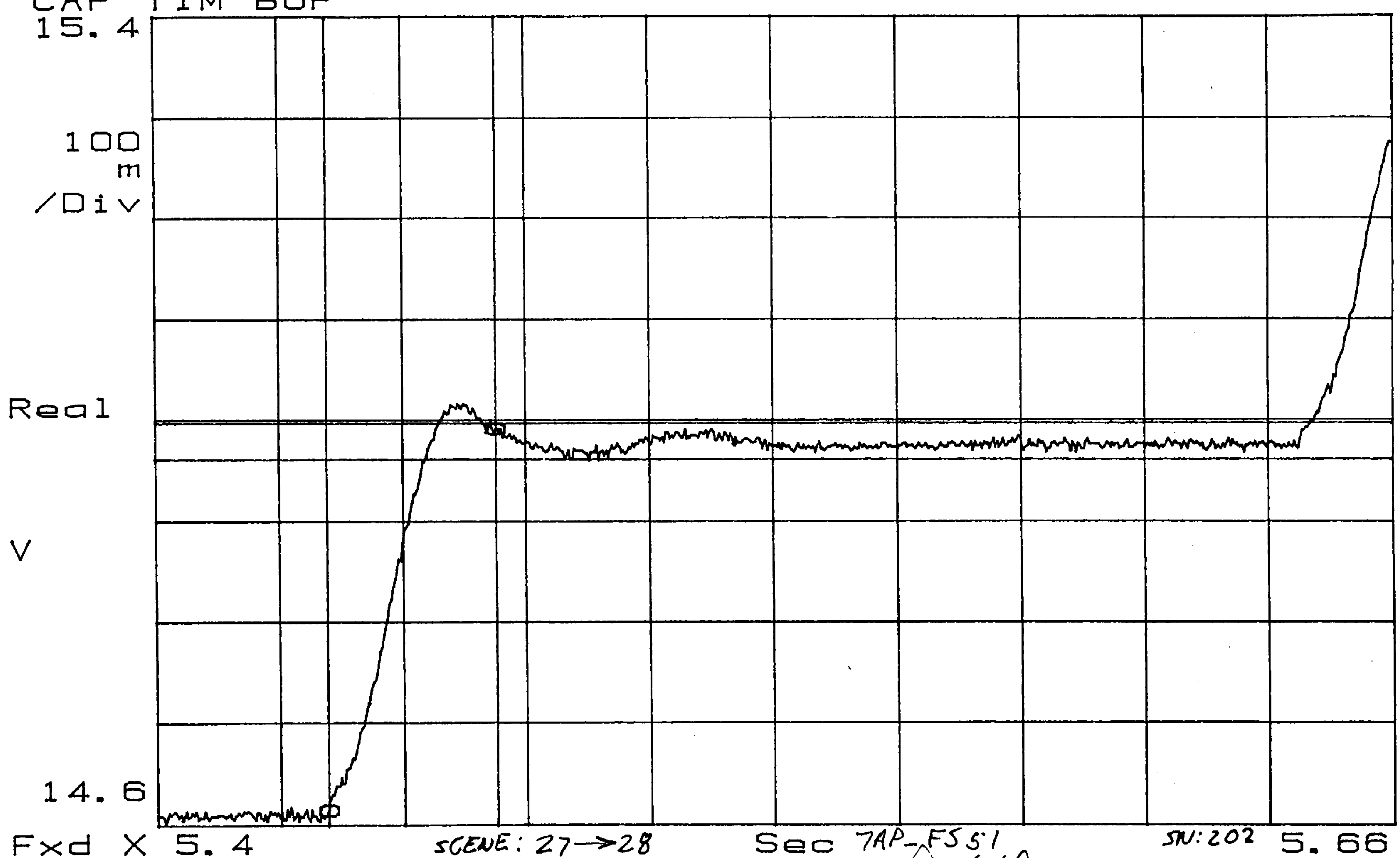
B26

X=5.233 S ΔX=35.16mS Y=14.5968 ΔY=35.88mV
Ya=14.2493 ΔYa=382.7mV
CAP TIM BUF



SCENE: 26→27 7AP-FS51 SN:202
S/O: 298561 3 4.4.5_34 Test Eng: Kay Hergberg Date: 1-28-98
P/N: 1356008-K-1T A1-1 Quality: 71 228 JAN 02 98 QP0320

X=5.436 S ΔX=35.16mS Y=14.9607 ΔY=35.88mV
Ya=14.6143 ΔYa=376.3mV
CAP TIM BUF



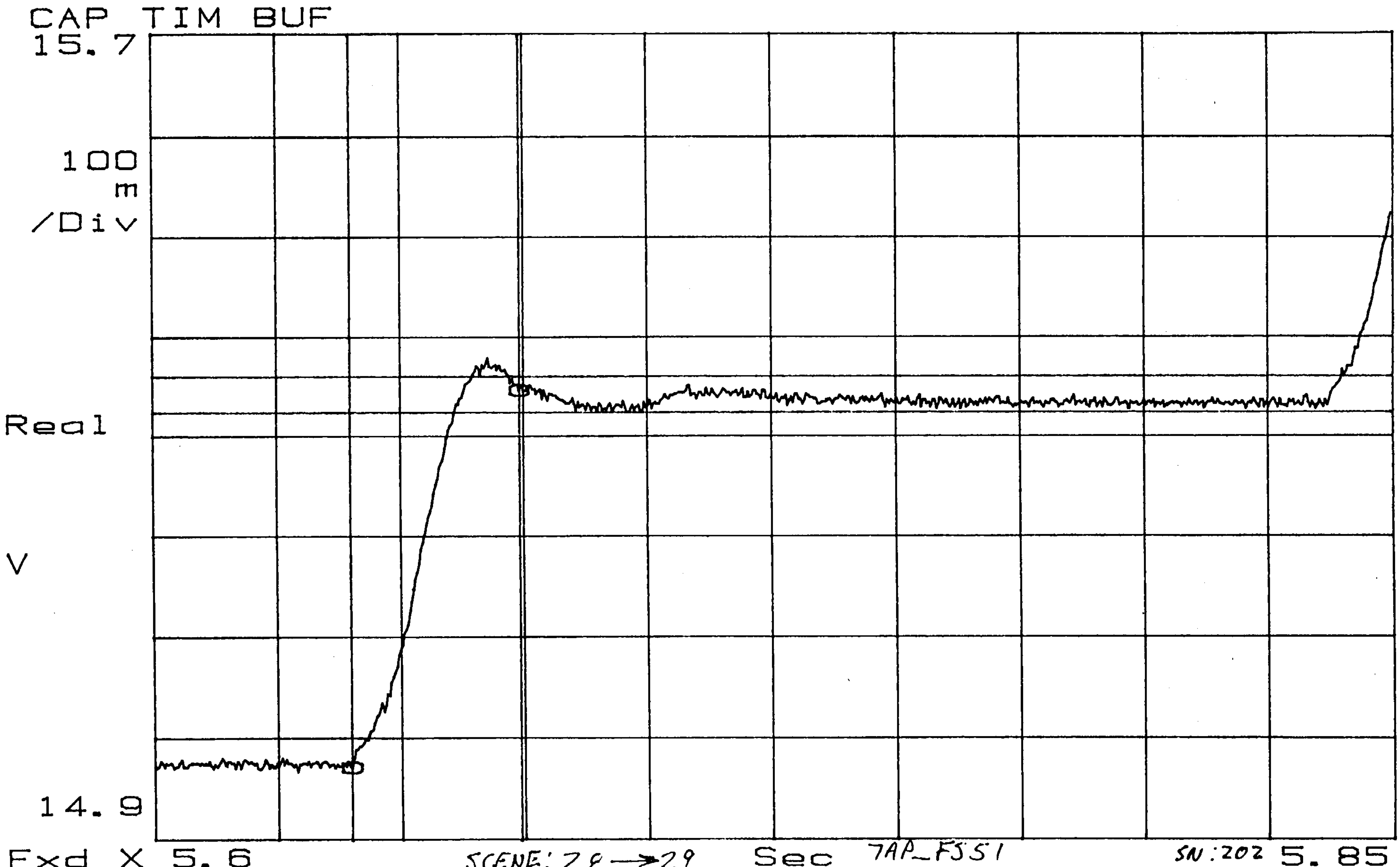
SCENE: 27→28 7AP_FS51 SN:202

S/O: 298561 34.4.6 – 35 Test Eng: Date: 1-28-98

P/N: 135600 B-1-1T A1-1 Quality: 7A 228 JAN 30 Φ.0320

B28

X=5.638 S ΔX=35.16mS Y=15.3242 ΔY=35.88mV
Ya=14.9711 ΔYa=374.6mV

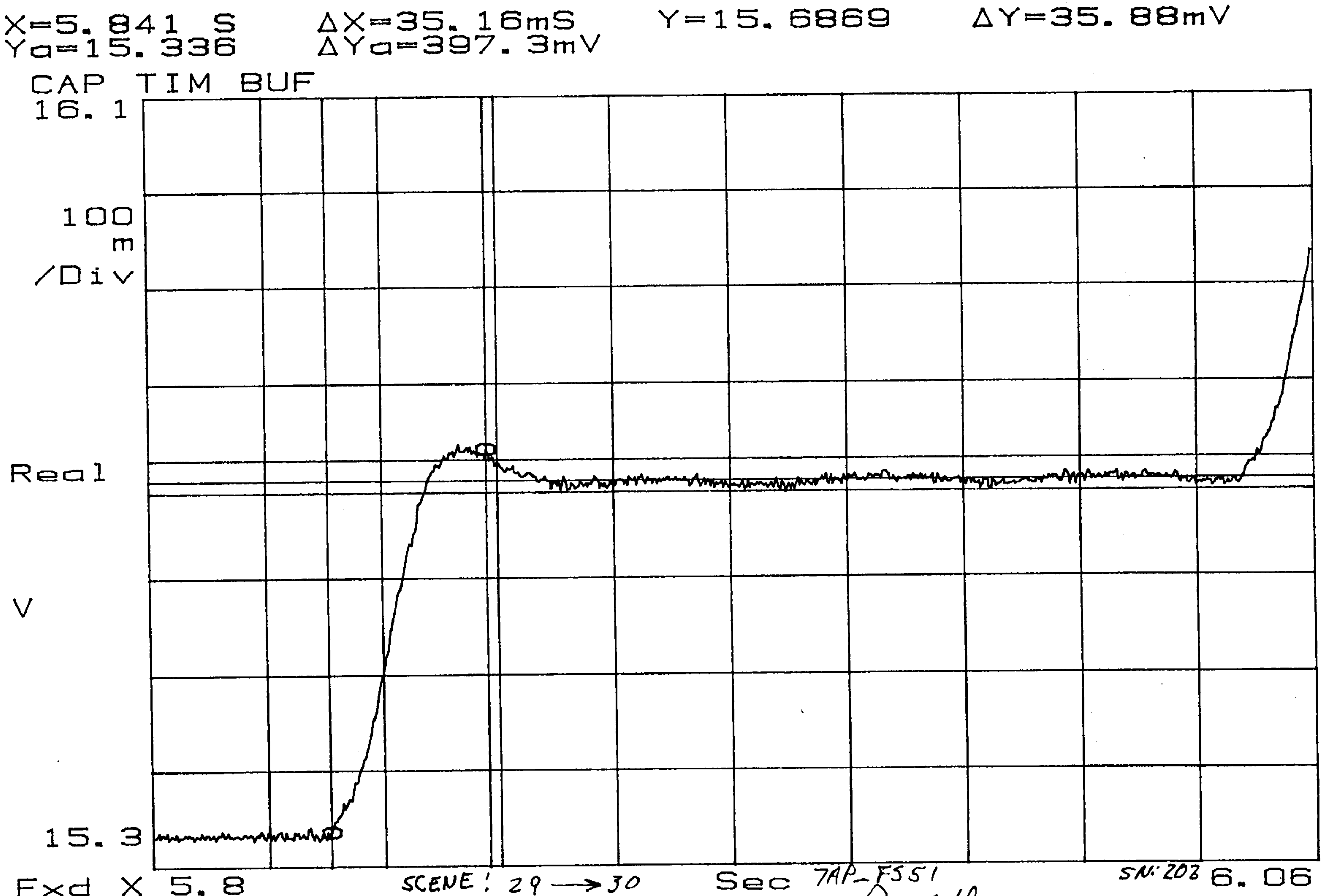


SCENE: 28 → 29 7AP_FS51 SN: 202

S/O: 298561 3445_36 Test Eng: [signature] Date: 1-28-98

P/N: 1356000-1 - PT A1-1 Quality: 30 98 op-0320

B25



SCENE: 29 → 30

7AP_F551

SN: 203

S/O: 298561

P/N: 1356008-1-1T

344.5_37

A/-1

Test Eng: Ray Hu[illegible]

Date: 1-28-98

Quality: 7A 228 op-0320

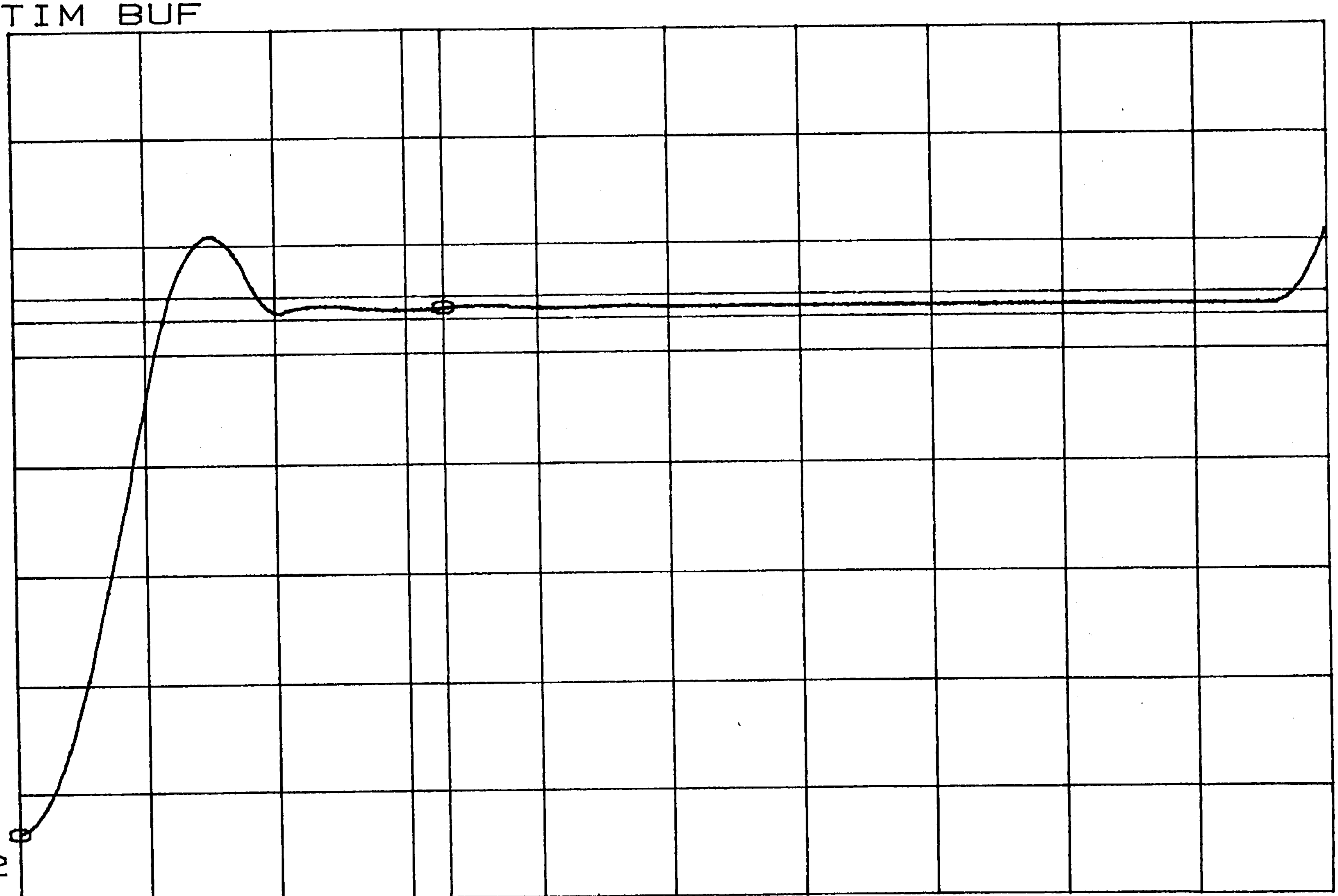
B30

B31

This page has been intentionally left blank

X=6.043 S ΔX=210.2mS Y=19.4511 ΔY=166.8mV
Ya=15.7025 ΔYa=3.832 V

CAP TIM BUF



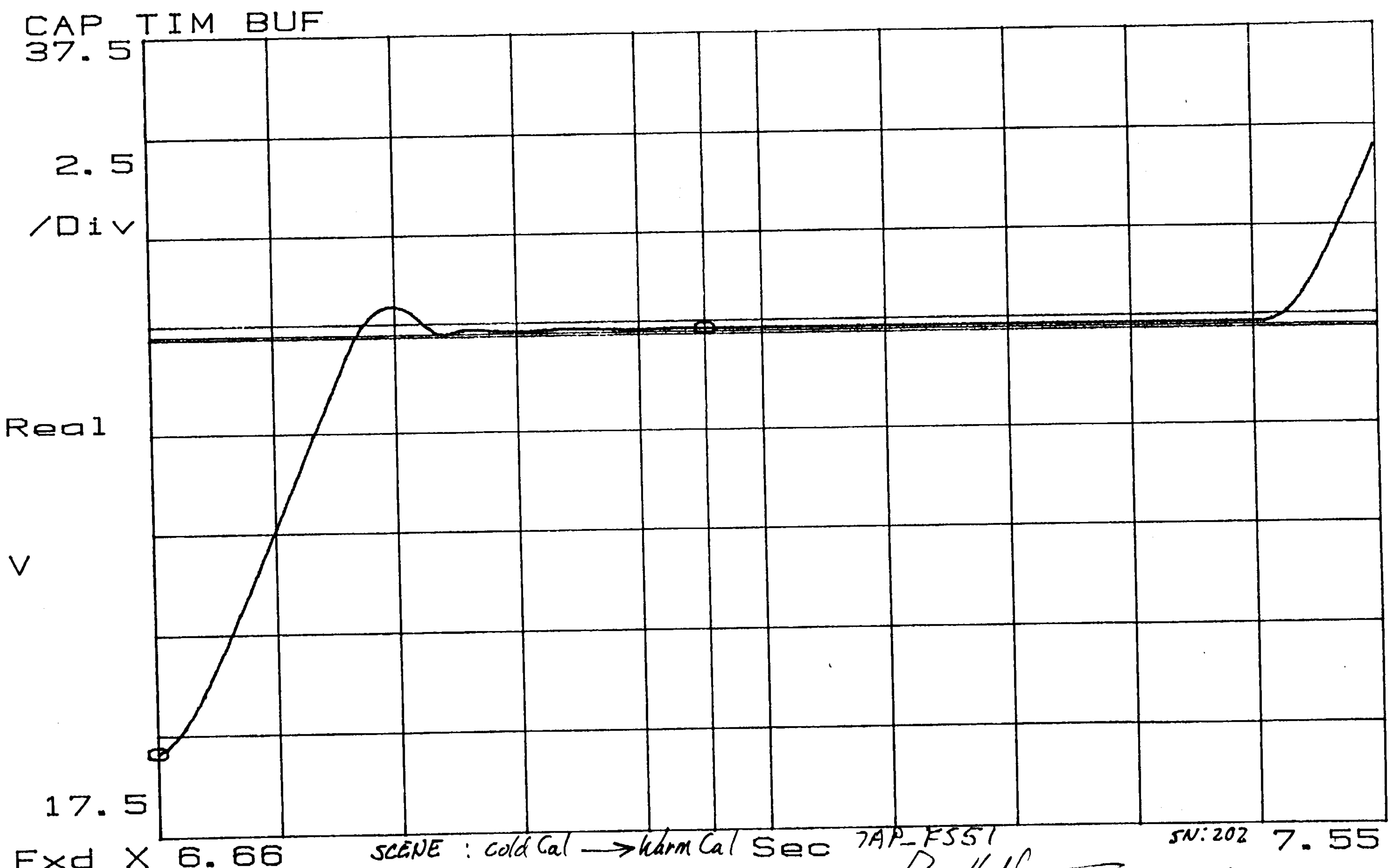
SCENE: 30 → Cold Cal TAP FS51 SN: 207

S/O: 298561 344.6—38 Test Eng: Ray Hertzberg Date: 1-28-98

P/N: 1356008-1-1T A1-1 Quality: 7A 228 30 98 OP-0320

B32

X=6.664 S ΔX=400.4mS Y=29.9242 ΔY=339.4mV
Ya=19.5819 ΔYa=10.48 V

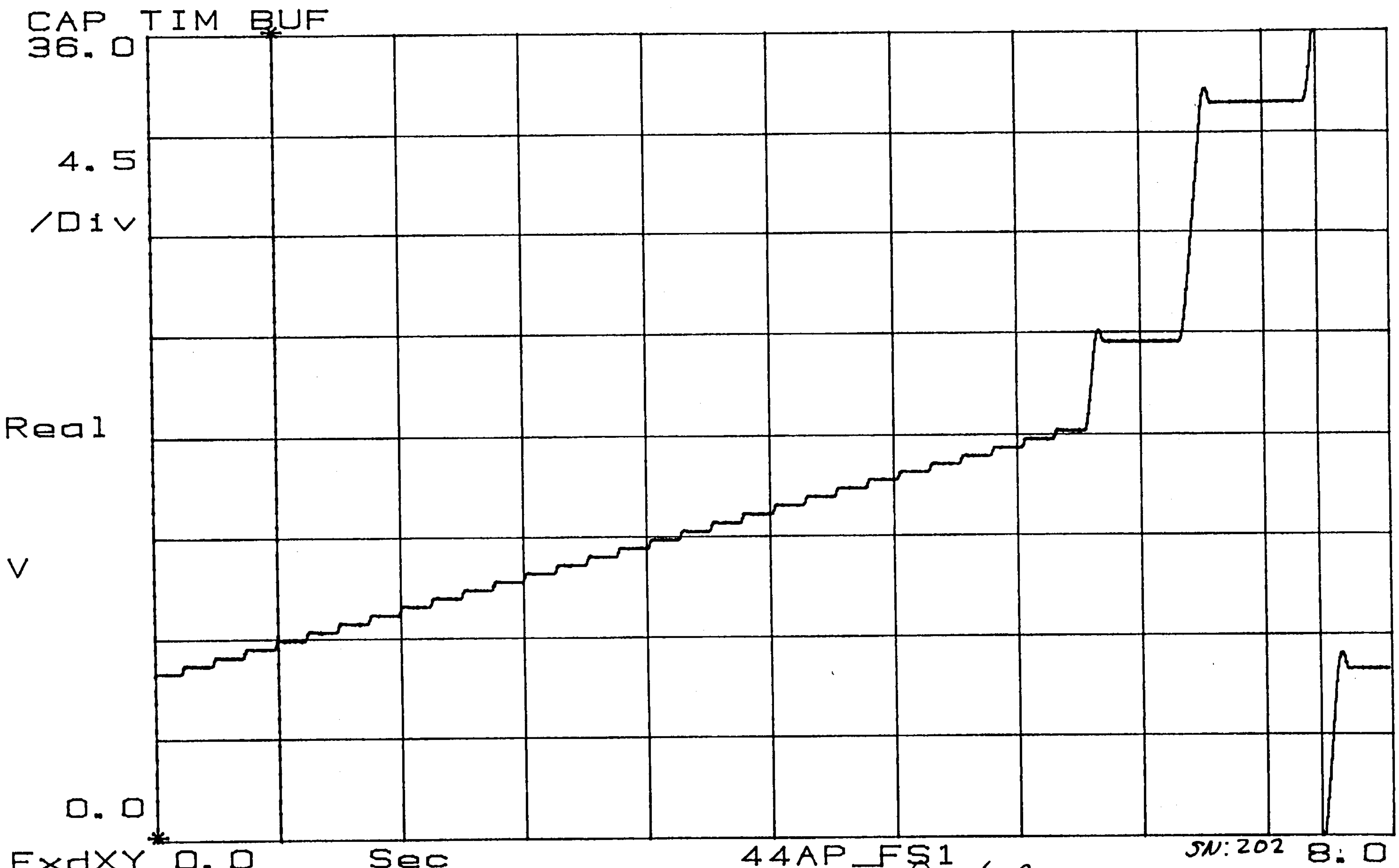


SCENE : Cold Cal → Warm Cal 7AP_FS51 SN: 202

S/o: 298561 3.4.4.6_39 Test Eng: Ray Herzberg Date: 1-28-98

P/N: 1356008-1-1T Al-1 Quality: 228 op-0320

B33



SN: 202

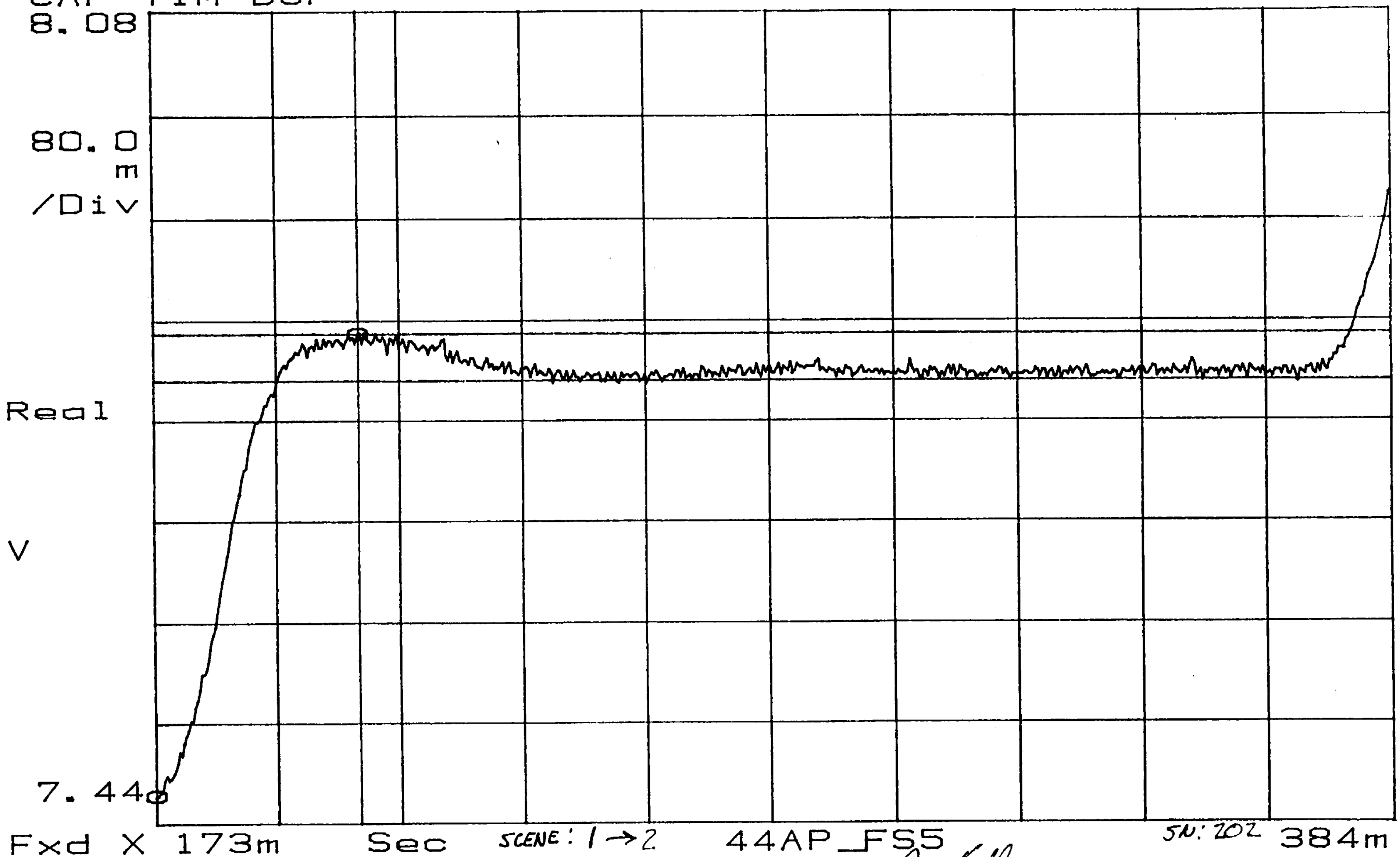
S/O: 298561 3.4.4.5_44 Test Eng: [signature] Date: 1-28-98

P/N: 1356008-1-1T A1-2 Quality: (7A 228) JAN 30 op. 0320

B34

X=172.7mS ΔX=35.16mS Y=7.79297 ΔY=35.68mV
Ya=7.46201 ΔYa=366.5mV

CAP TIM BUF



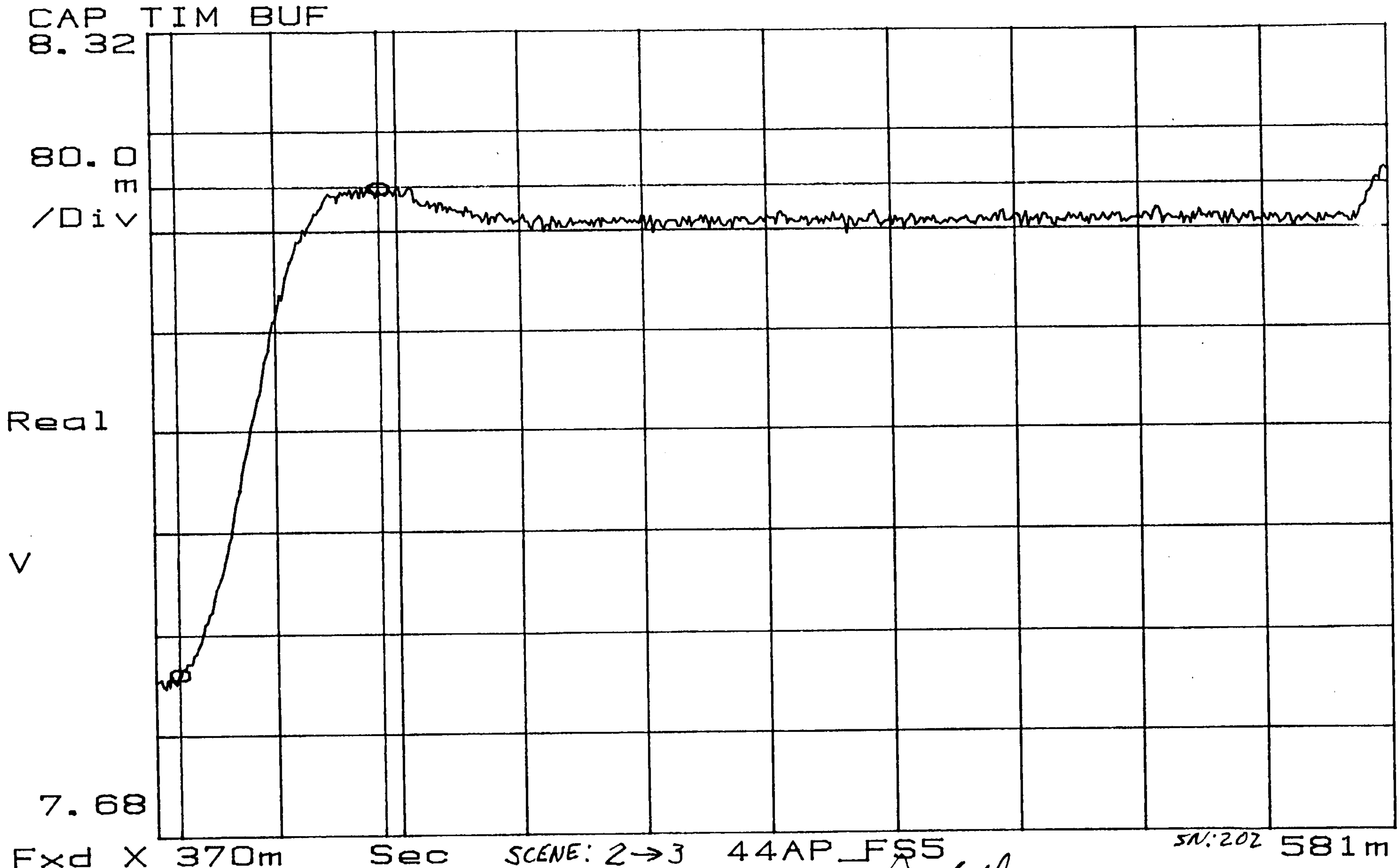
SCENE: 1 → 2   44AP_FS5   SN: 202

S/O: 298561   3.4.4.5_9   Test Eng: [signature]   Date: 1-28-98

P/N: 1356008-1-LT   A1-2   Quality: [signature] 1-30-98 op. 0320

B35

X=373.8mS ΔX=35.16mS Y=8.15903 ΔY=36.07mV
Ya=7.80746 ΔYa=386.0mV

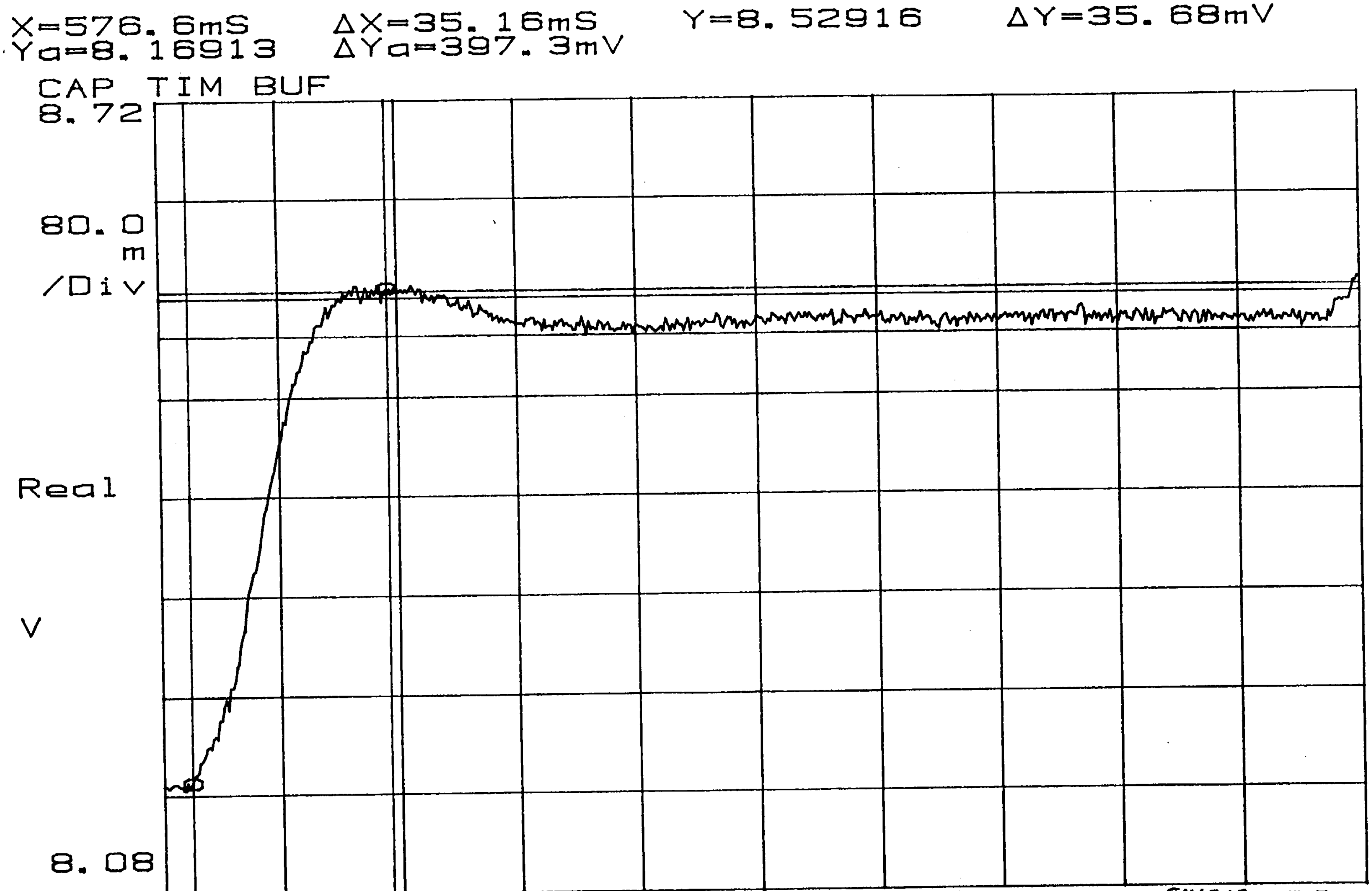


SCENE: 2→3 44AP_FS5 SN: 202

S/O: 298561 3.4.4.5_10 Test Eng: Ray [signature] Date: 1-28-98

P/N: 1356008-1-1T A1-2 Quality: 7A 228 JAN 30 98 op.0320

B36

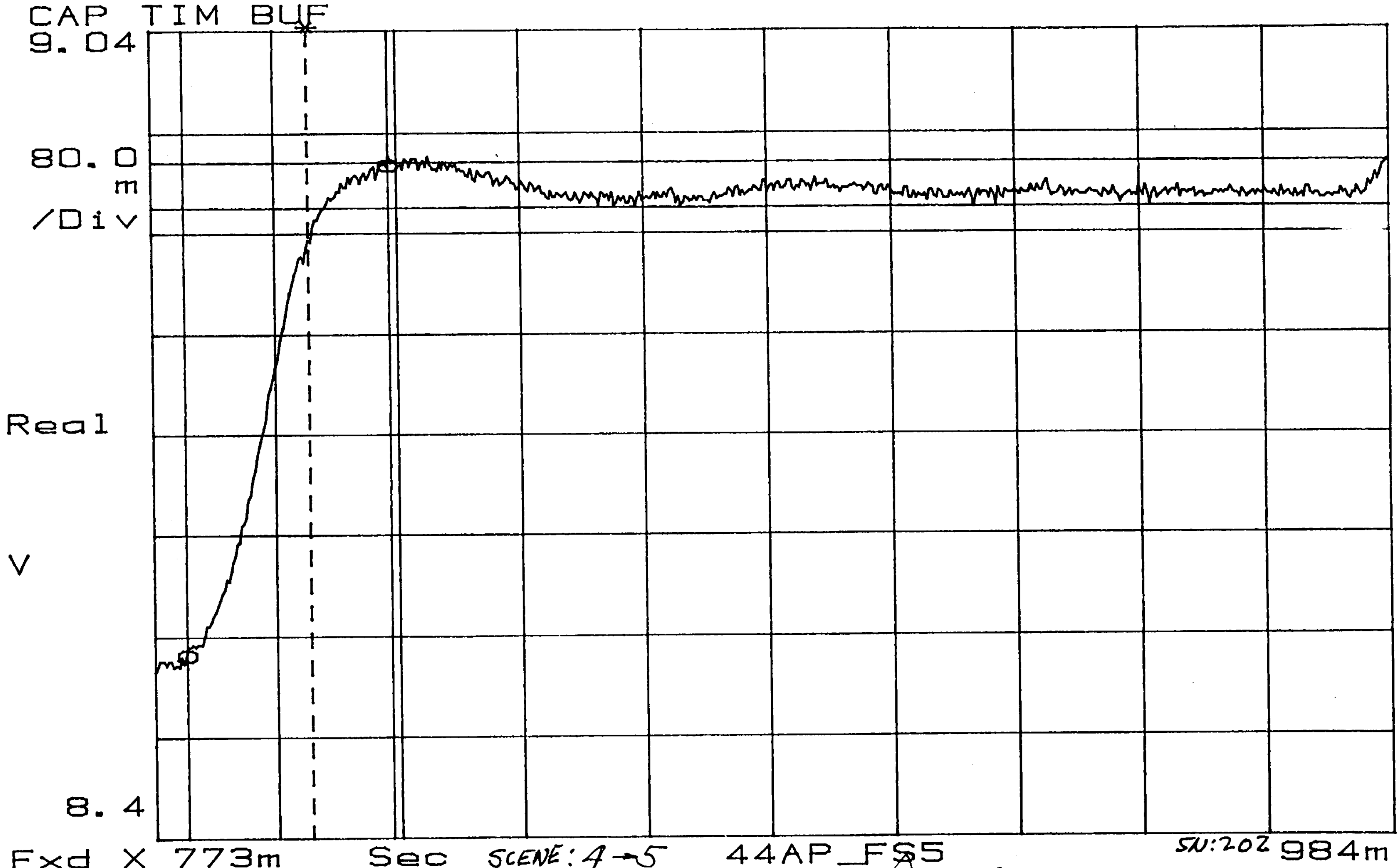


SCENE: 3 → 4 44AP_FS5 SN: 202

S/O: 29856L 3.4.4.5_11 Test Eng: Ray [signature] Date: 1-28-98

P/N: 1356008-1-1T A1-2 Quality: TN 228 JAN 30 98 Q. 0320

X=778.5mS ΔX=35.16mS Y=8.89997 ΔY=36.07mV
Ya=8.54377 ΔYa=389.2mV

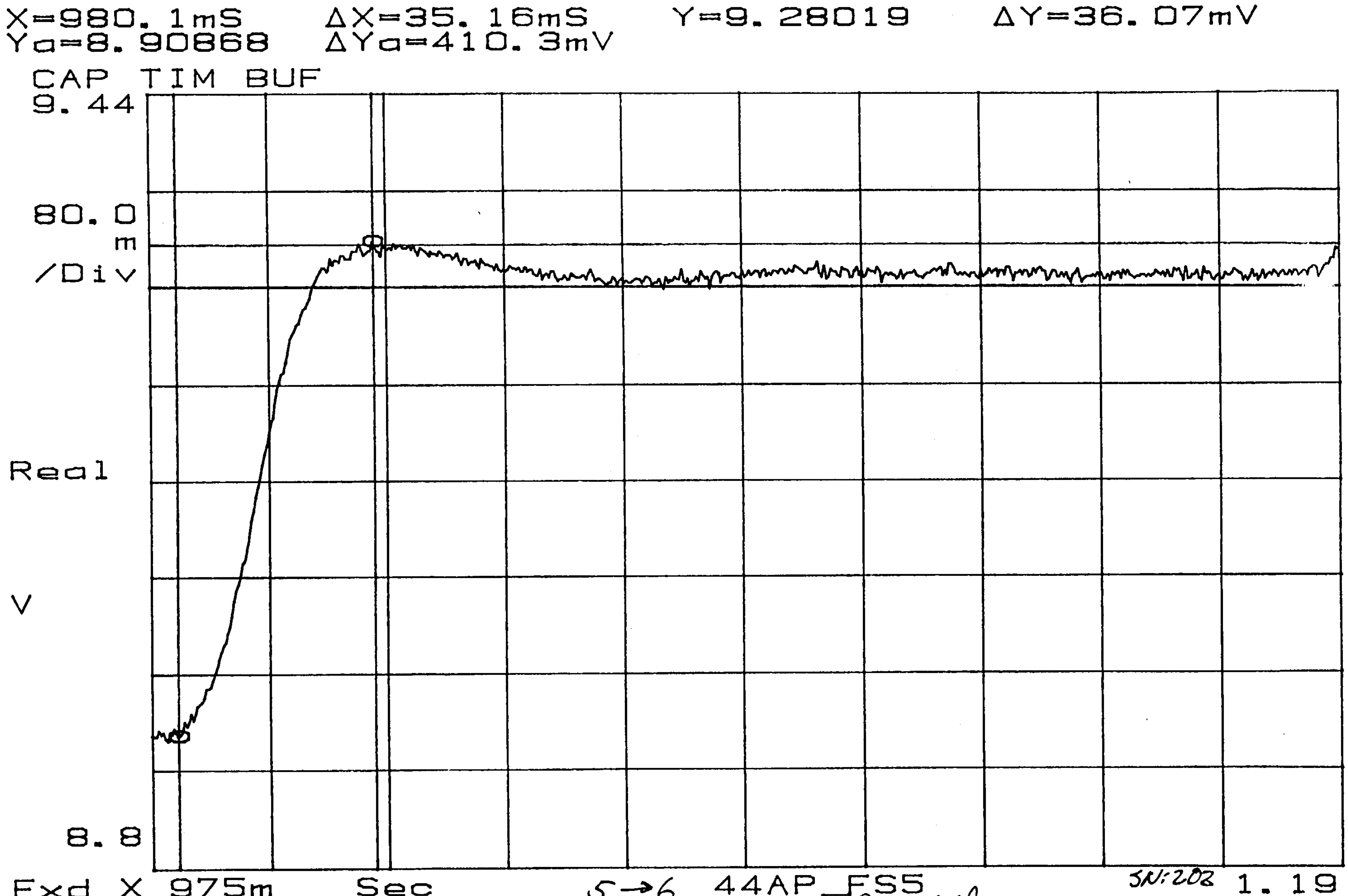


SCENE: 4→5 44AP_FS5 SN:202

S/O: 298561 3.4.4.5-12 Test Eng: [signature] Date: 1-28-98

P/N: 1356008-1-LT A1-2 Quality: A 228 JAN 30 98 qp.0320

B38



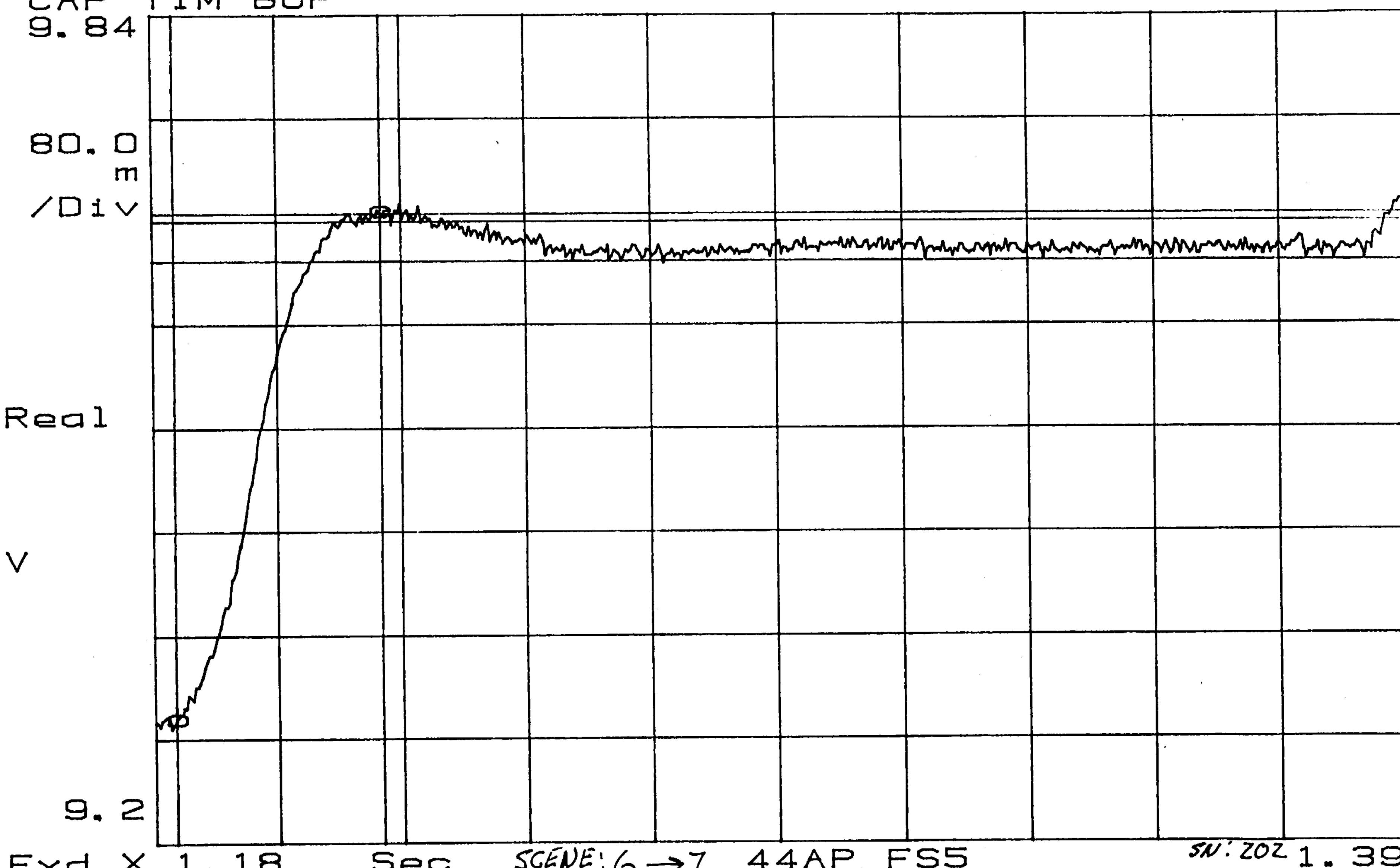
5→6 44AP_FS5 SN:202 1. 19

S/O: 298561 3.4.4.5_13 Test Eng: Ray [signature] Date: 1-28-98

P/N: 1356008-1-1T A1-2 Quality: (A 228) JAN 30 98 QP.0320

B39

X=1.184 S ΔX=35.16mS Y=9.64955 ΔY=36.07mV
Ya=9.29467 ΔYa=392.5mV



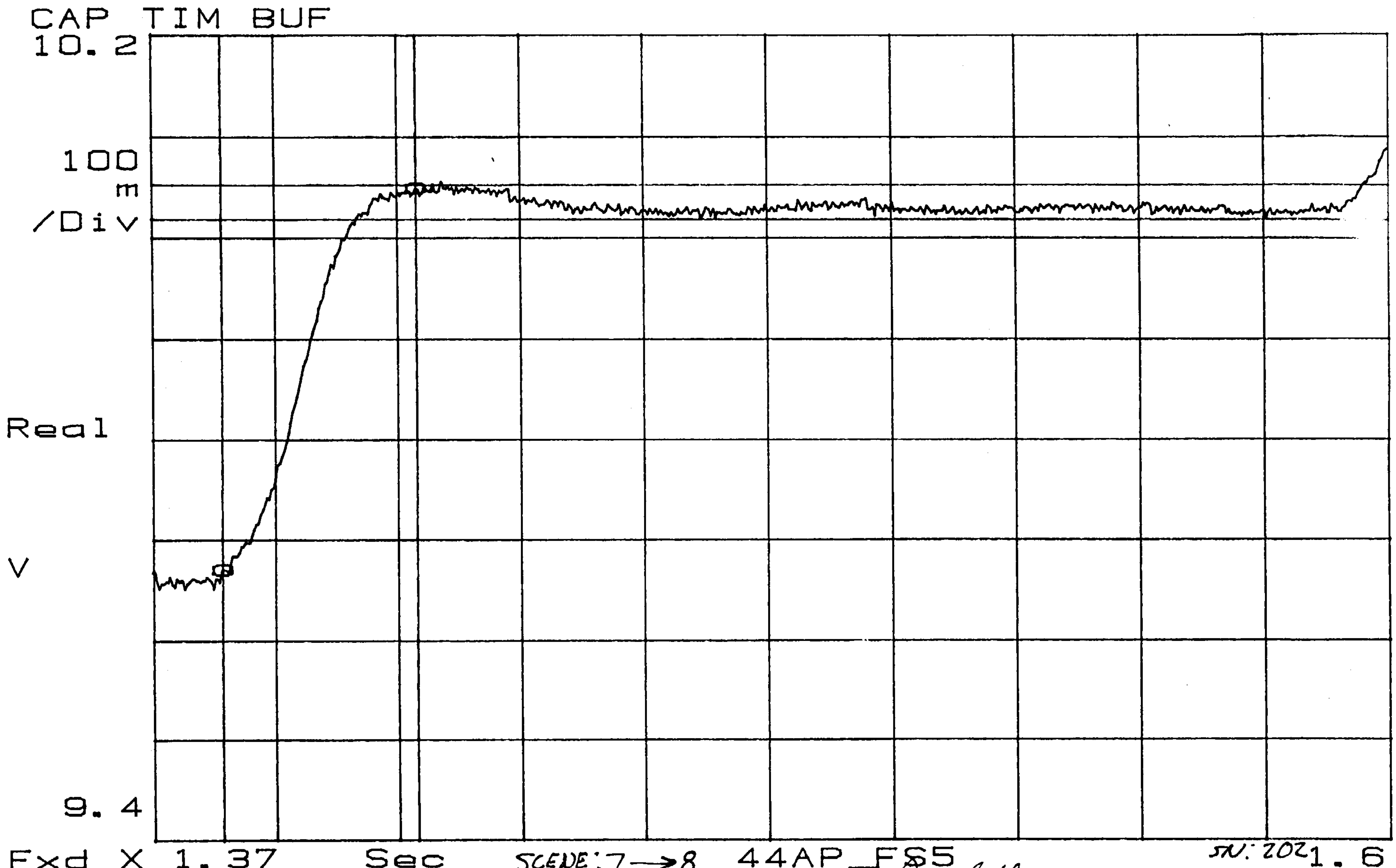
SCENE: 6 → 7 44AP_FS5 SN: 202

S/O: 298561 3.4.4.5-14 A1-2 Test Eng: Ray [signature] Date: 1-28-98

P/N: 1356008-1-1T Quality: [signature] JAN 20 98 QP.0320

B4C

X=1.387 S   ΔX=35.16mS   Y=10.0172   ΔY=35.88mV
Ya=9.66932   ΔYa=379.5mV



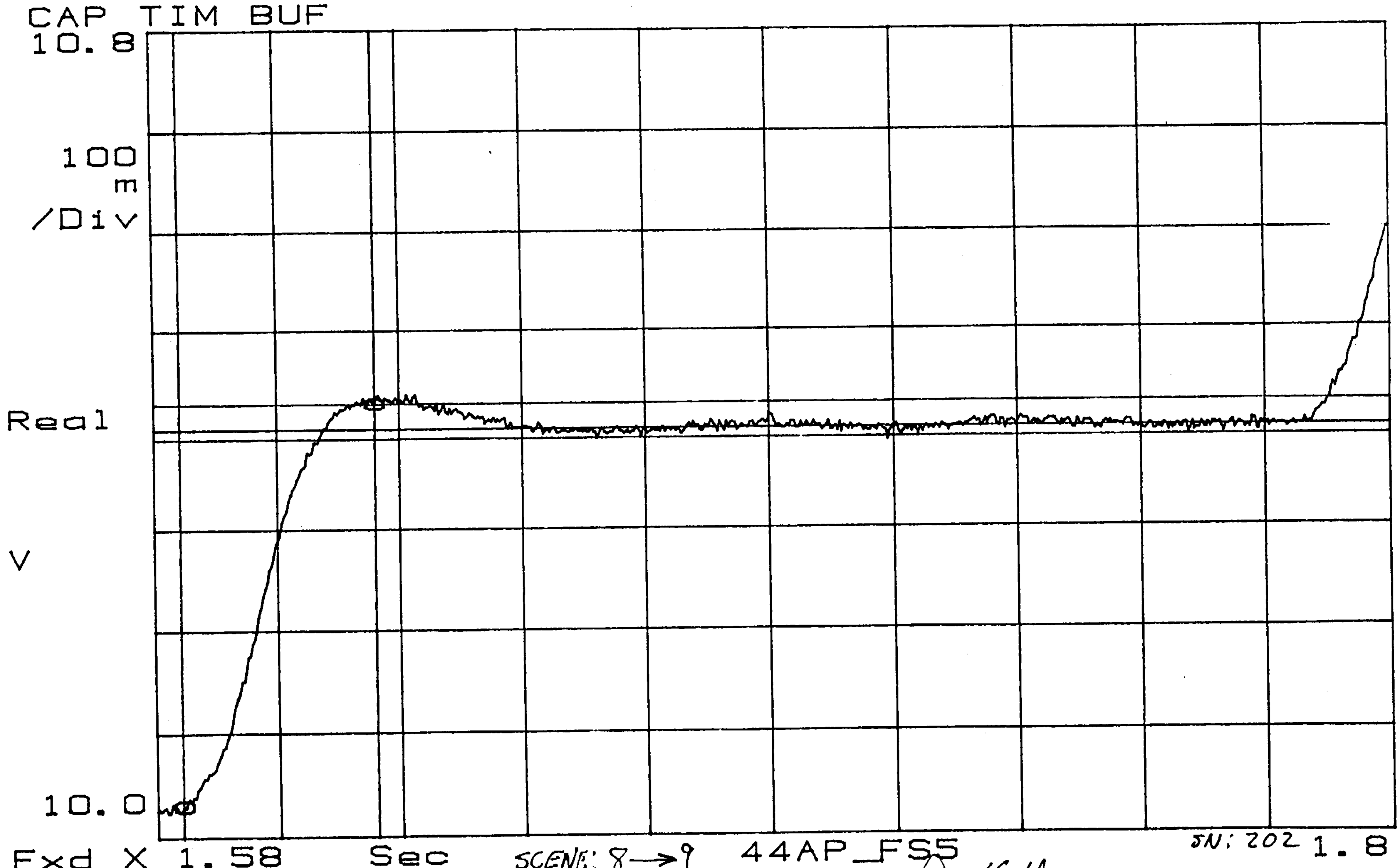
SCENE: 7 → 8   44AP_FS5   SN: 202

S/O: 298561   3.4.4.5_15   Test Eng: ______ Date: 1-28-98

P/N: 1356008-1-1T   A1-2   Quality: ______ 30 98 QP-0320

B41

X=1.588 S   ΔX=35.16mS   Y=10.3893   ΔY=35.88mV
Ya=10.0294   ΔYa=395.7mV



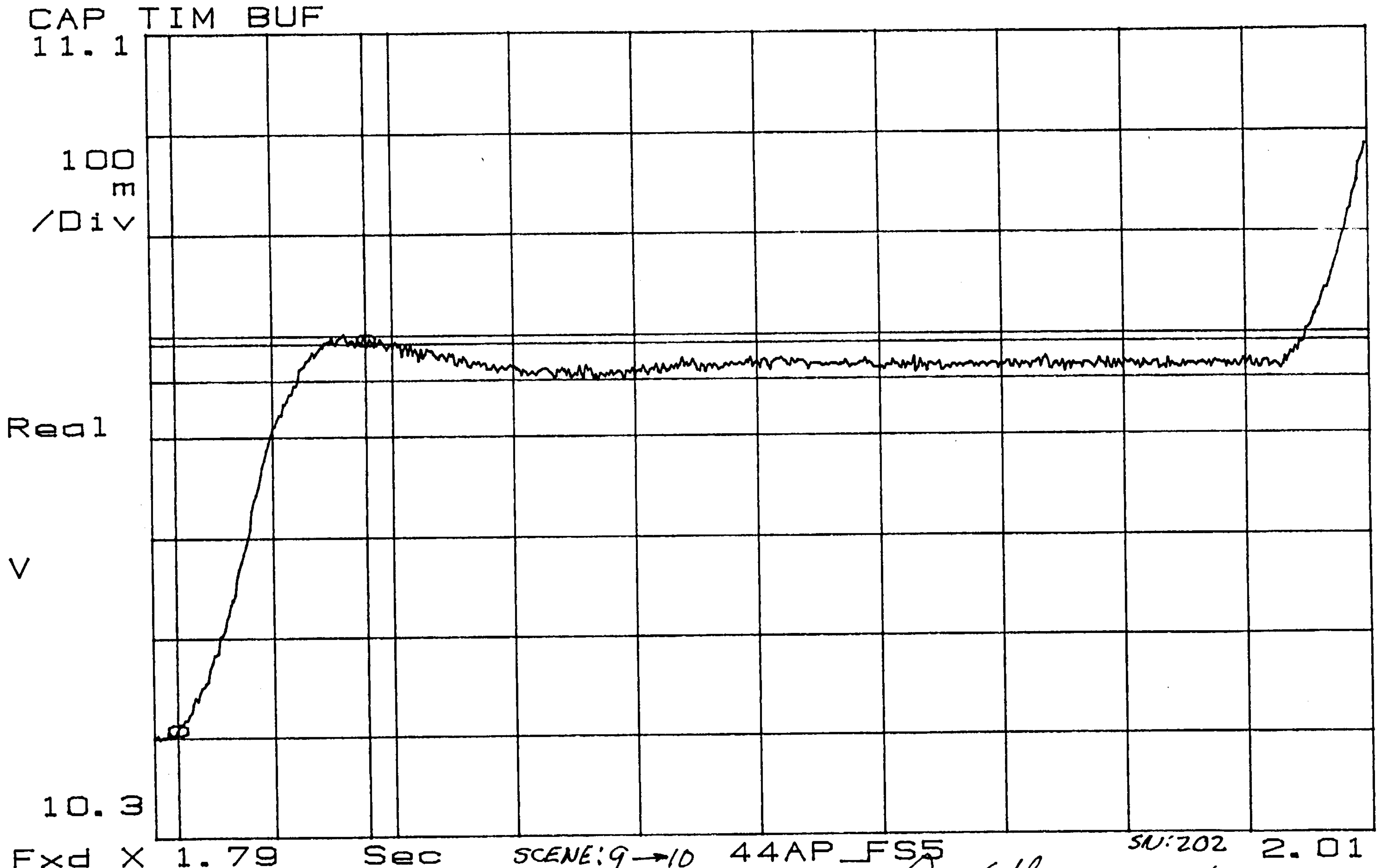
SCENE: 8→9   44AP_FS5   SN: 202

S/O: 298561   3445_16   Test Eng: Ray [signature]   Date: 1-28-98

P/N: 1356008-1-1T   A1-2   Quality: TA 228 1-30-98   op 0320

B42

X=1.791 S ΔX=35.16mS Y=10.7558 ΔY=35.88mV
Ya=10.4072 ΔYa=387.6mV



SCENE: 9 → 10 44AP_FS5 S/N: 202

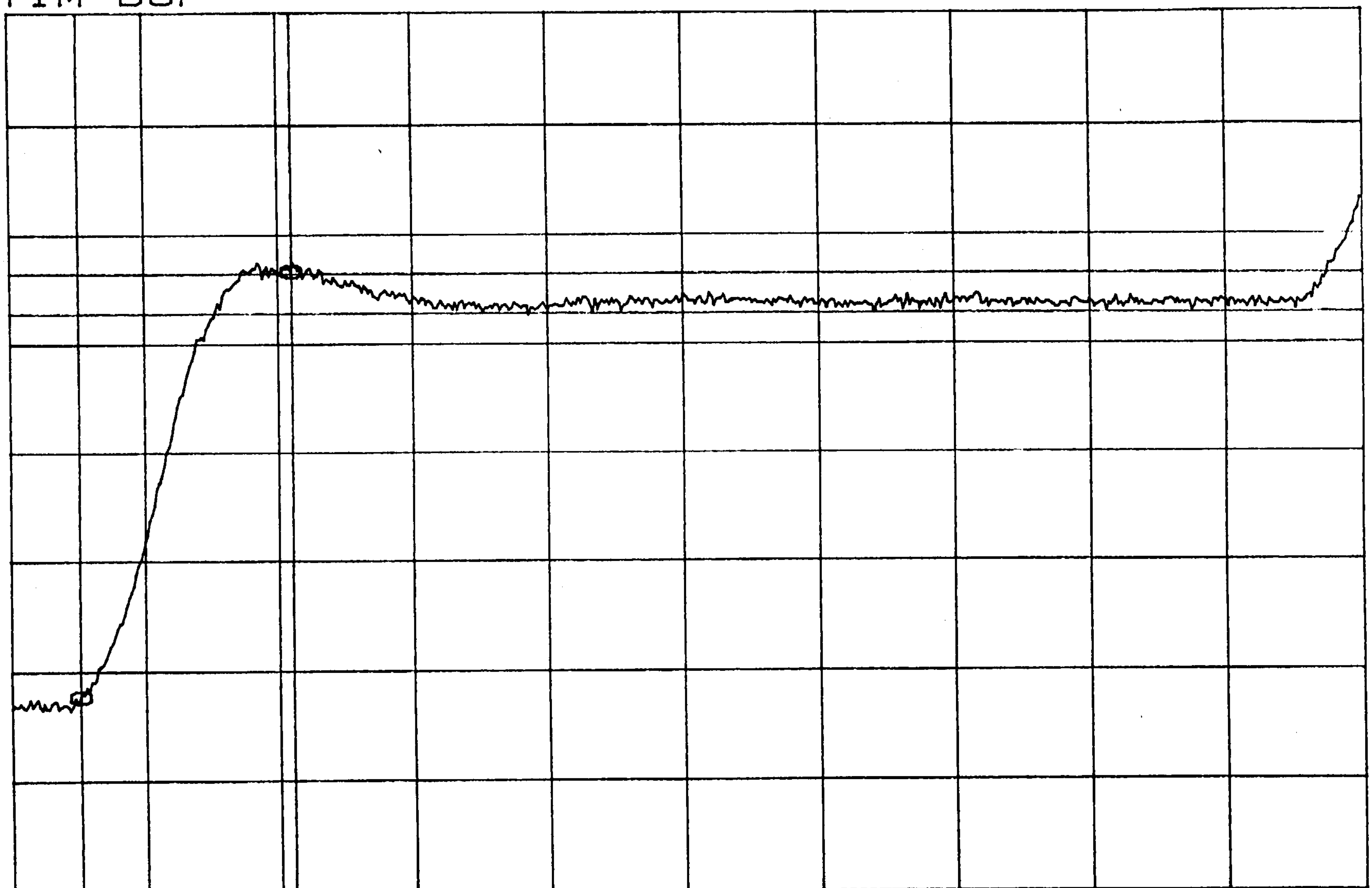
S/O: 298561 3.1.4.5-17 Test Eng: Ray [signature] Date: 1-28-98

P/N: 1356008-1-1T A1-2 Quality: 7A 220 JAN 30 98 QP 0320

B43

X=1.995 S ΔX=35.16mS Y=11.1285 ΔY=35.88mV
Ya=10.7754 ΔYa=390.9mV

CAP TIM BUF



Fxd X 1.98 Sec SCENE: 10→11 44AP_FS5 SN:202 2.2

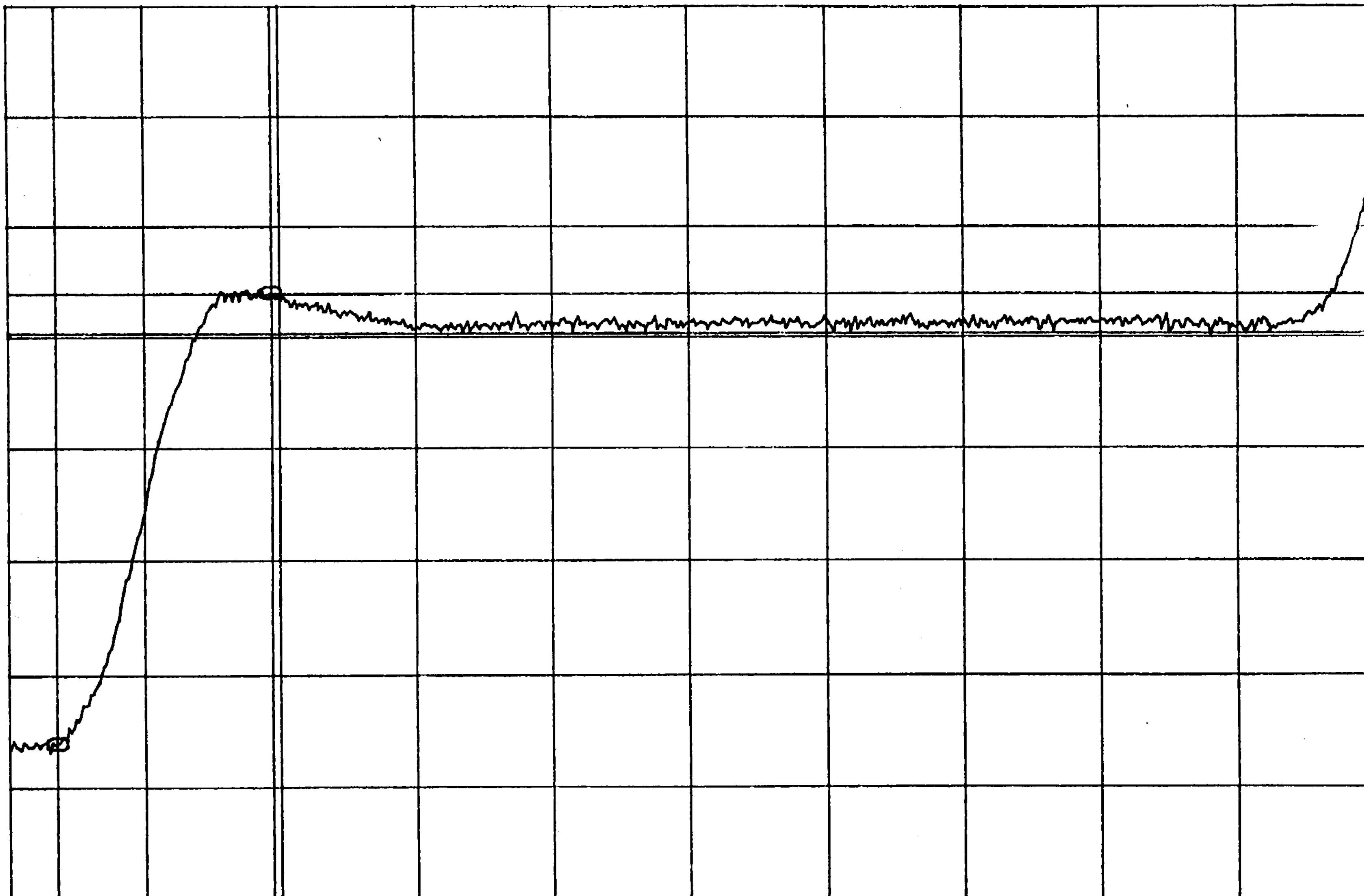
S/O: 298561 3445-18 Test Eng: Ray Herzberg Date: 1-28-98

P/N: 1356008-1-1T A1-2 Quality: 7A/228 JAN 30 98 Q.0320

B4

X=2.195 S ΔX=35.16mS Y=11.5028 ΔY=35.88mV
Ya=11.1387 ΔYa=400.6mV

CAP TIM BUF



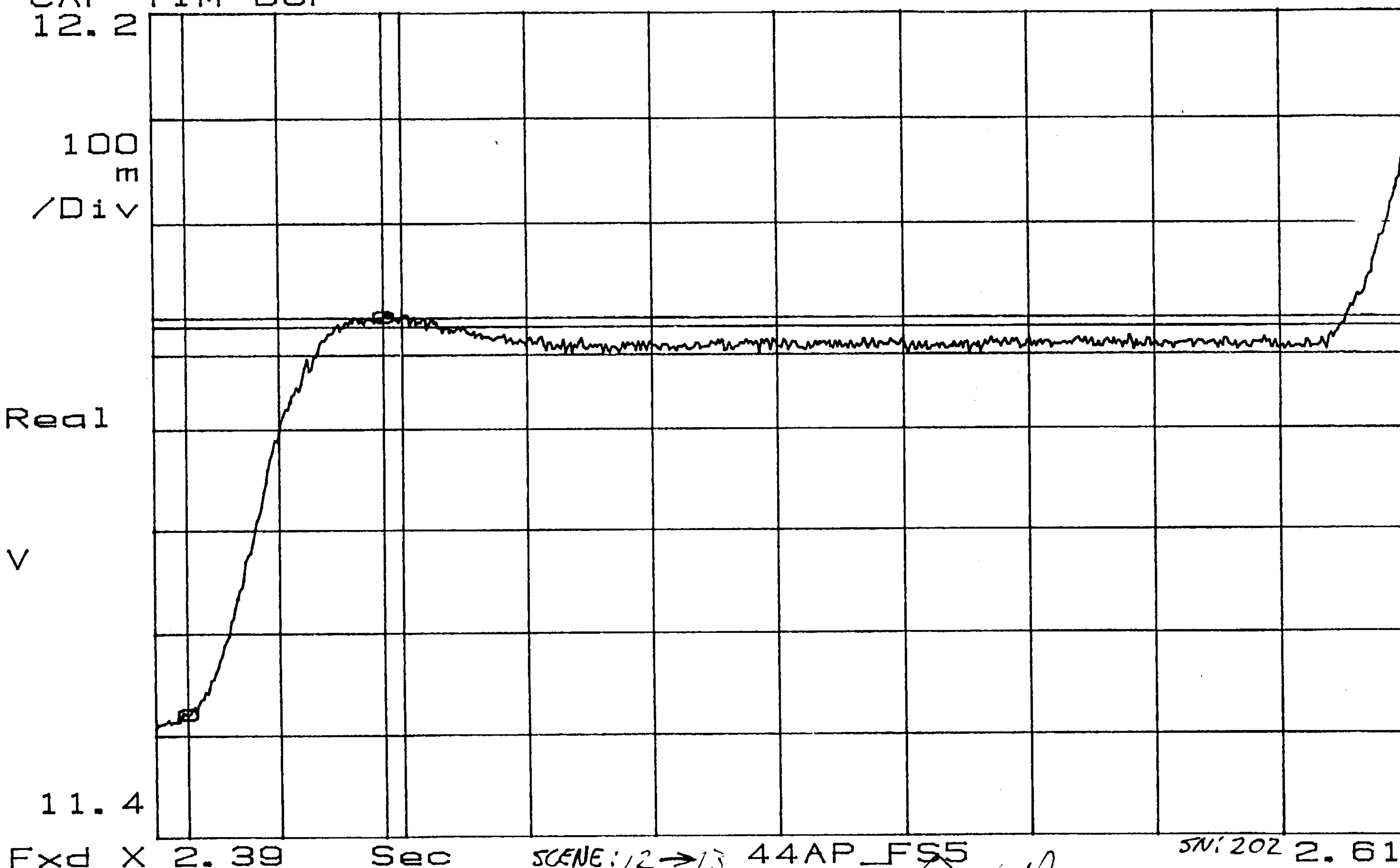
Fxd X 2.19 Sec SCENE: 11 → 12 44AP_FS5 SN:202 2.41

S/O: 298561 S 3.4.4.5_19 Test Eng: Date: 1-28-98

P/N: 1356008-1-LT A1-2 Quality: 7A 228 0P.0320

B4

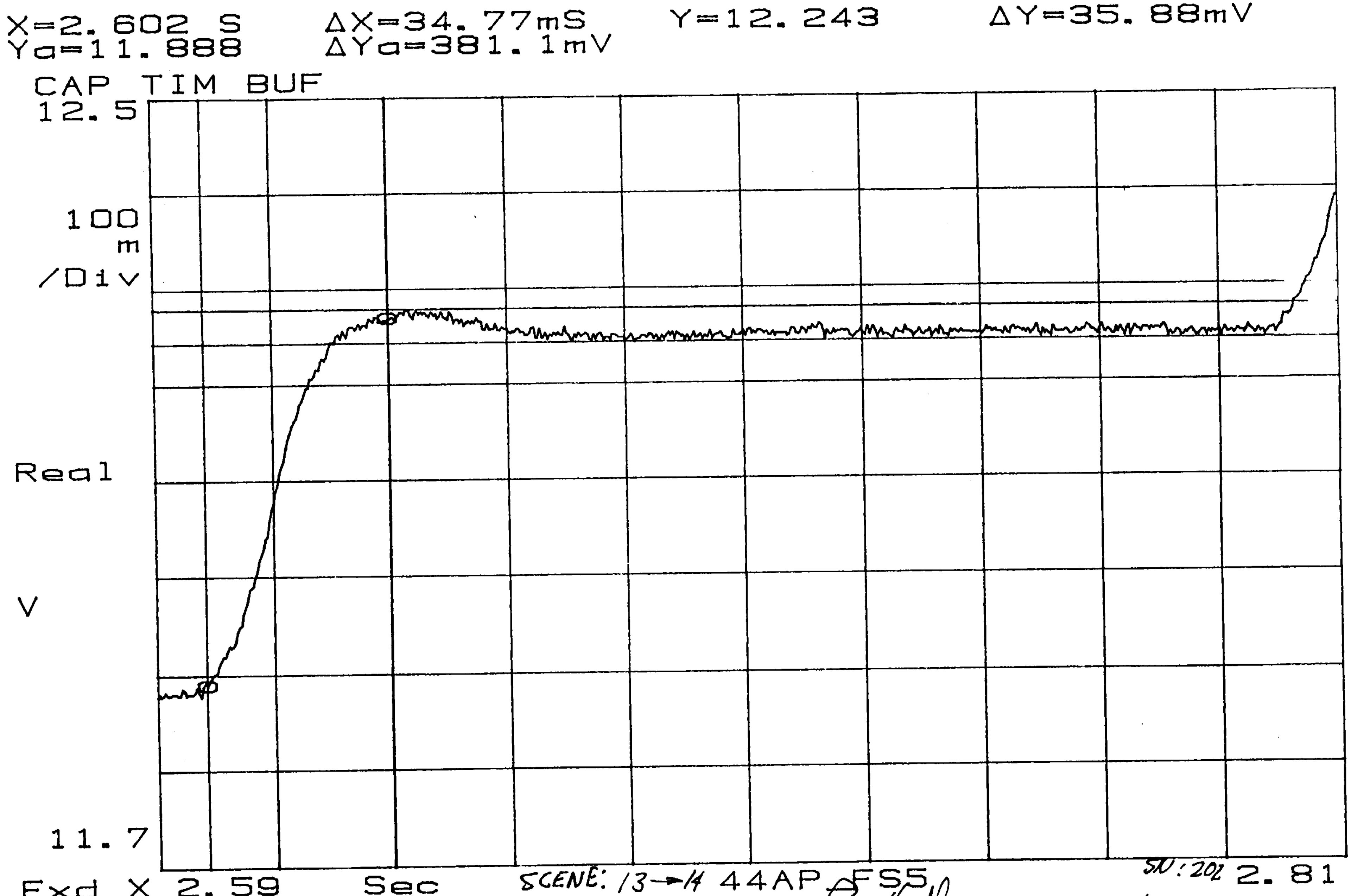
X=2.399 S ΔX=35.16mS Y=11.8722 ΔY=35.88mV
Ya=11.5198 ΔYa=389.2mV
CAP TIM BUF



SCENE: 12→13 44AP_FS5 SN: 202

S/O: 298561 3.4.4.5_20 Test Eng: Date: 1-28-98
P/N: 135600B-1-1T A1-2 Quality: Q-0320

B4



SCENE: 13→14 44AP FS5

SN: 202

S/O: 298561

P/N: 1356008-1 -1T

3.4.4.5_21

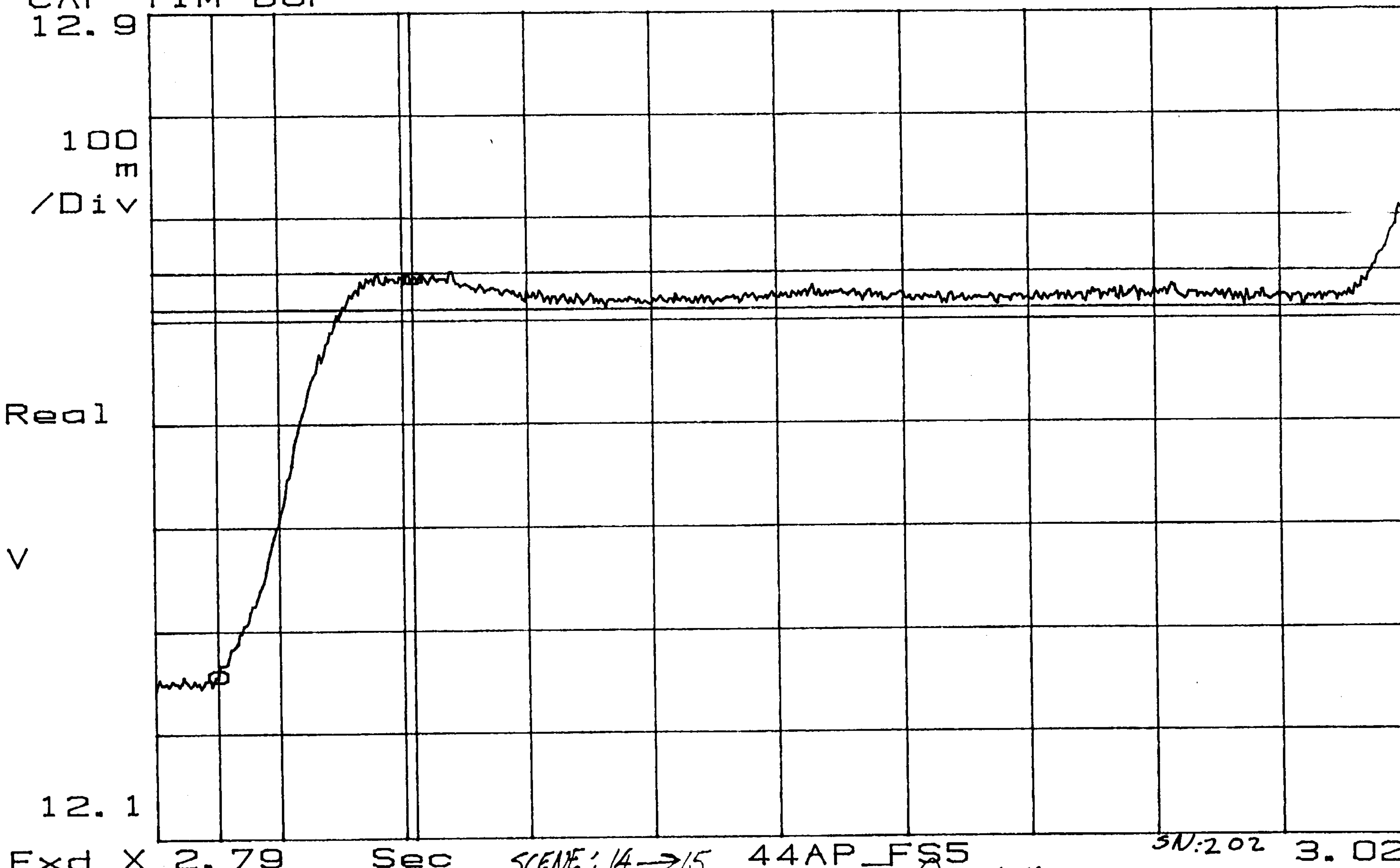
A1-2

Test Eng: Ray Herzberg

Date: 1-28-98

Quality: 0320

X=2.804 S ΔX=35.16mS Y=12.6101 ΔY=35.88mV
Ya=12.2561 ΔYa=384.4mV
CAP TIM BUF



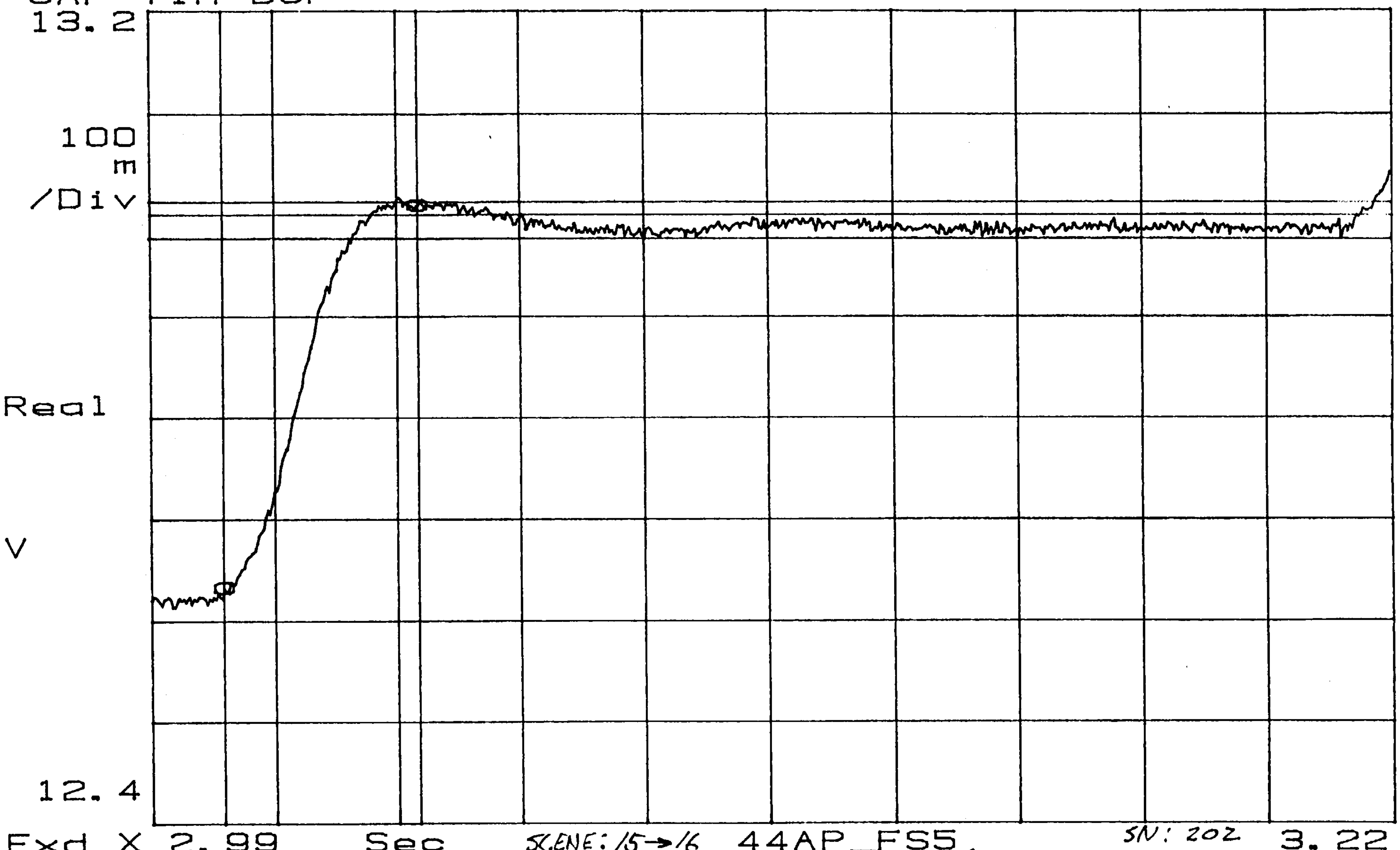
SCENE: 14→15 44AP_FS5 SN:202

S/O: 298561 3.4.4.5_22 Test Eng: Date: 1-28-98

P/N: 1356008-1-1T A1-2 Quality: 7A 228 QP0320

B48

X=3.007 S ΔX=35.16mS Y=12.9765 ΔY=35.88mV
Ya=12.6308 ΔYa=377.9mV
CAP TIM BUF



SCENE: 15→16 44AP_FS5 SN: 202

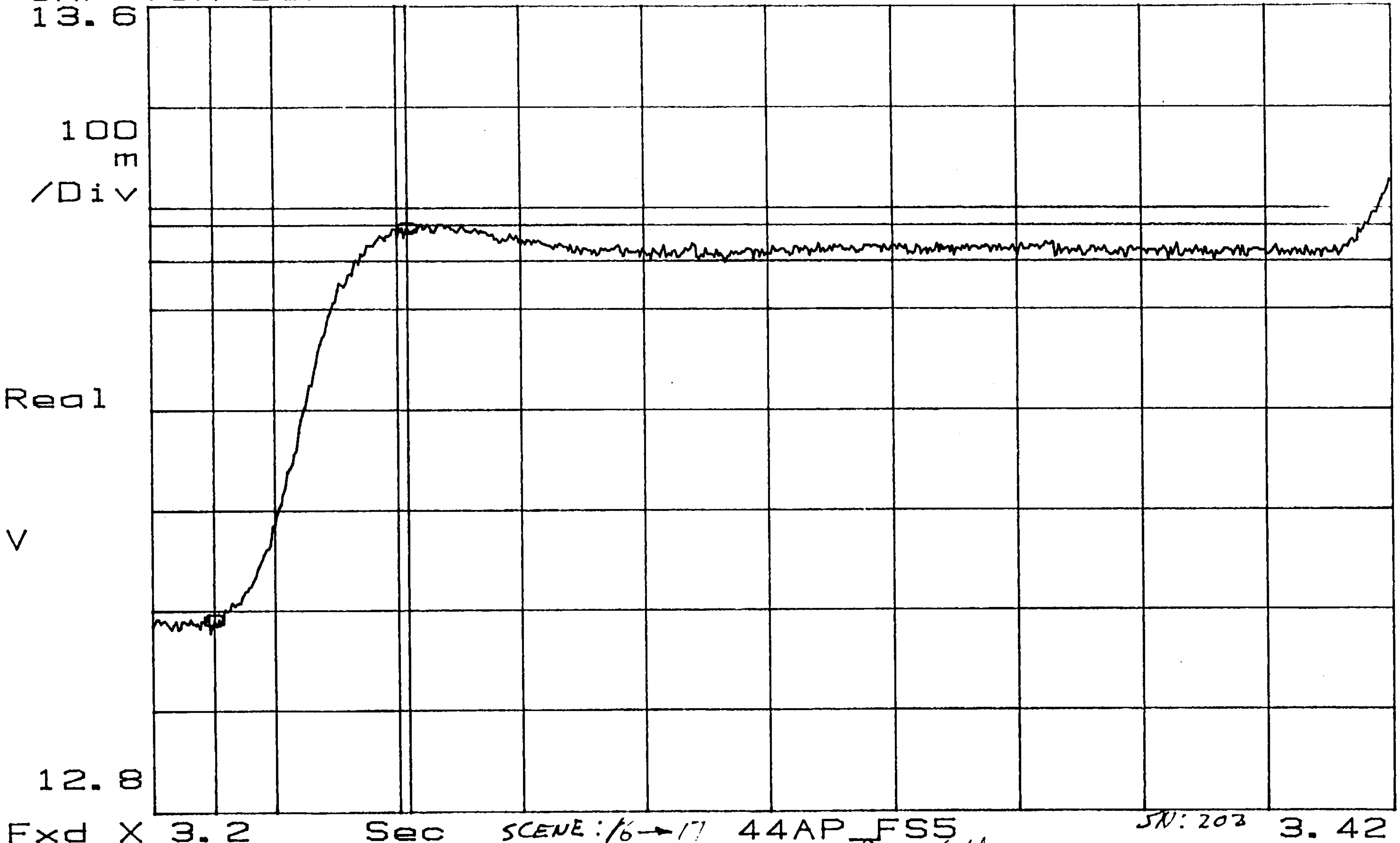
S/O: 298561 344.5_23 Test Eng: [illegible] Date: 1-28-98

P/N: 135600 8-1-LT A1-2 Quality: [illegible] 7A 228 JAN 30 98 qp 0320 -

B49

X=3.208 S ΔX=35.16mS Y=13.3464 ΔY=35.88mV
Ya=12.9892 ΔYa=389.2mV

CAP TIM BUF



SCENE: 16→17 44AP_FS5

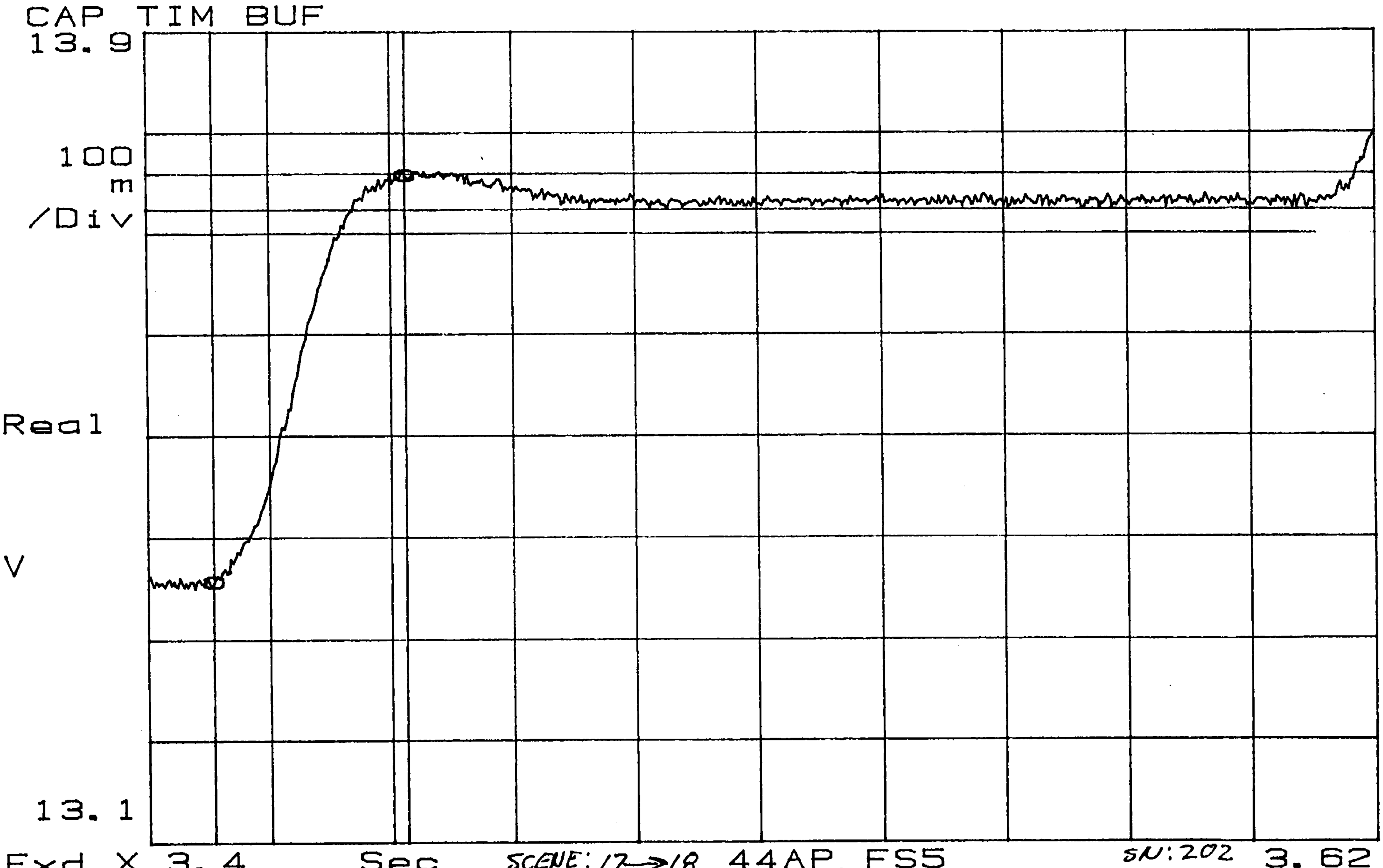
SN: 203

S/O: 298561 3.4.4.5_24 Test Eng: Ray [signature] Date: 1-28-98

P/N: 1356008-1-IT A1-2 Quality: 7A 228 of 0320.

B50

X=3.41 S   ΔX=35.16mS   Y=13.7225   ΔY=35.88mV
Ya=13.3557   ΔYa=400.6mV



SCENE: 17→18 44AP_FS5   SN: 202

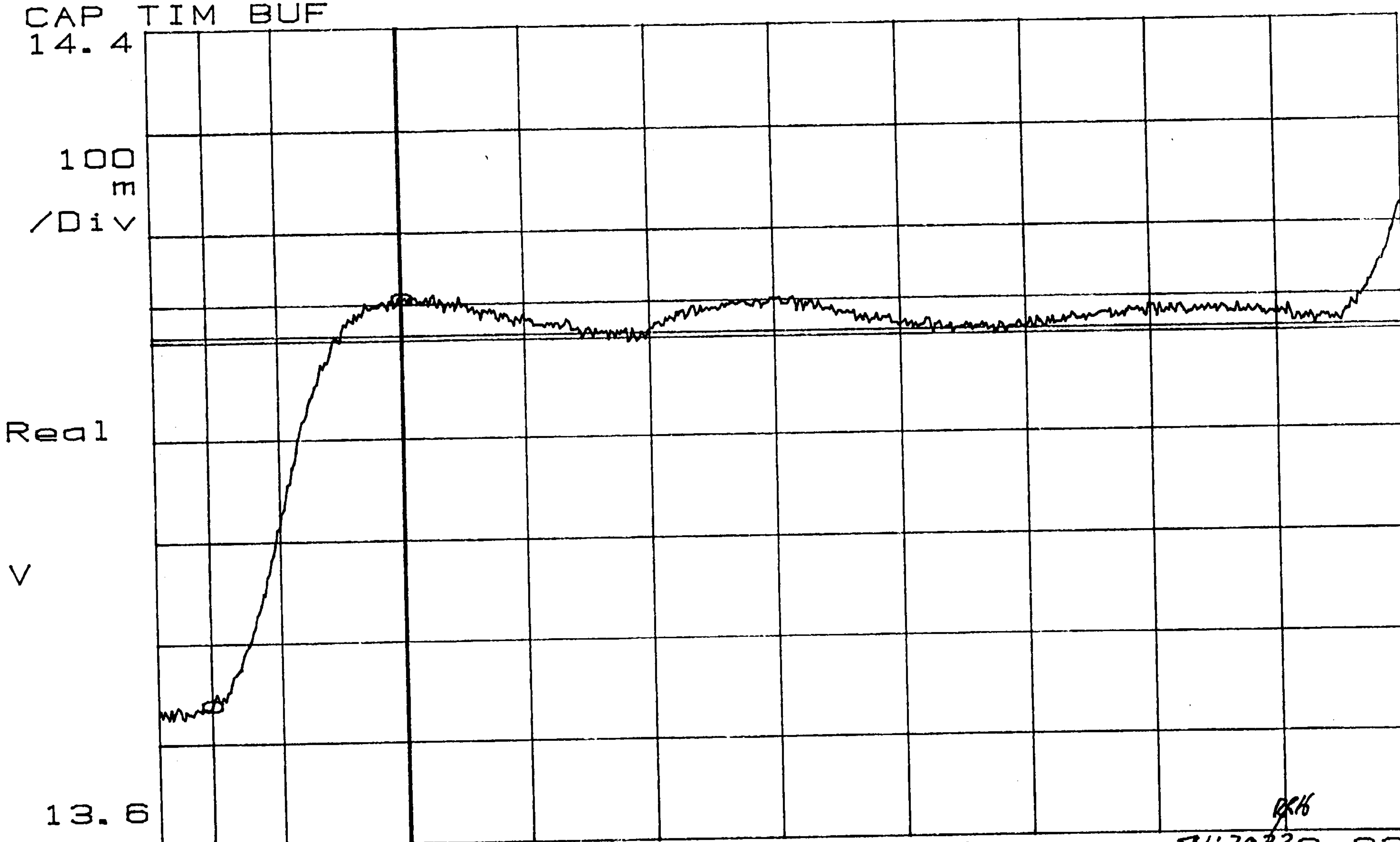
S/O: 298561   3445_25   Test Eng: [signature]   Date: 1-28-98

P/N: 1356008-1-1T   A1-2   Quality: 7A 228   0p-0320

B51

X=3.614 S ΔX=35.16mS Y=14.1299 ΔY=35.88mV
Ya=13.7369 ΔYa=397.3mV

CAP TIM BUF



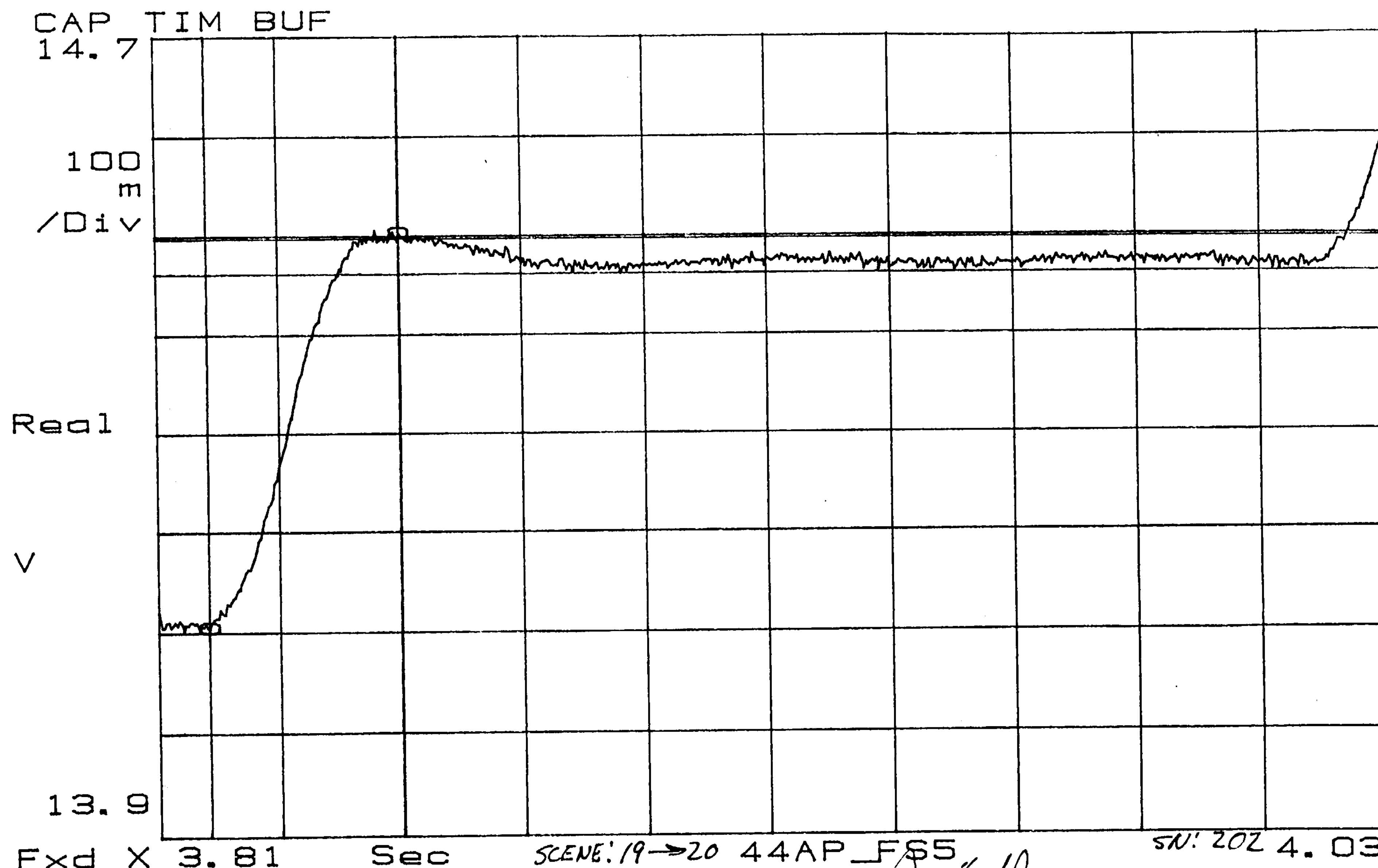
Fxd X 3.6 Sec SCENE: 18 → 19 44AP_FS5 SN: 20323.83

S/O: 298561 3.4.4.6_26 Test Eng: Ray Herzberg Date: 1-20-98

P/N: 1356008-1-II A1-2 Quality: 226 Q.0326

B52

X=3.816 S ΔX=35.16mS Y=14.4605 ΔY=35.88mV
Ya=14.1034 ΔYa=399.0mV



SCENE: 19→20 44AP_FS5 SN: 202

S/O: 298561 3.4.4.5-27 Test Eng: Ray Herzberg Date: 1-28-98

P/N: 135600B-1-IT A1-2 Quality: 7A 228 JAN 30 98 Q.0320

B53

X=4.019 S ΔX=35.16mS Y=14.8354 ΔY=35.88mV
Ya=14.4748 ΔYa=390.9mV

CAP TIM BUF

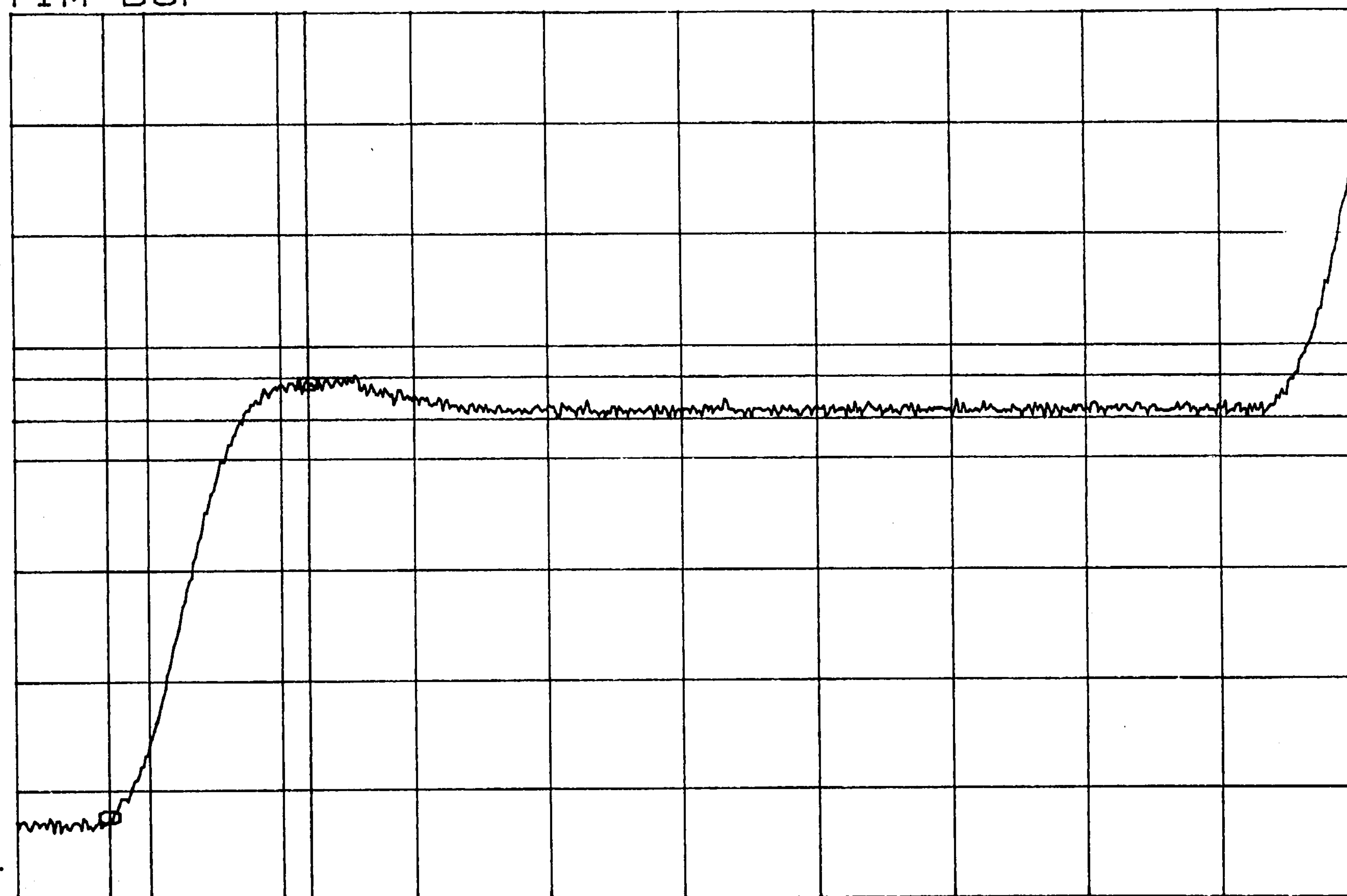
15.2

100 m /Div

Real

V

14.4



Fxd X 4.0 Sec 4.24

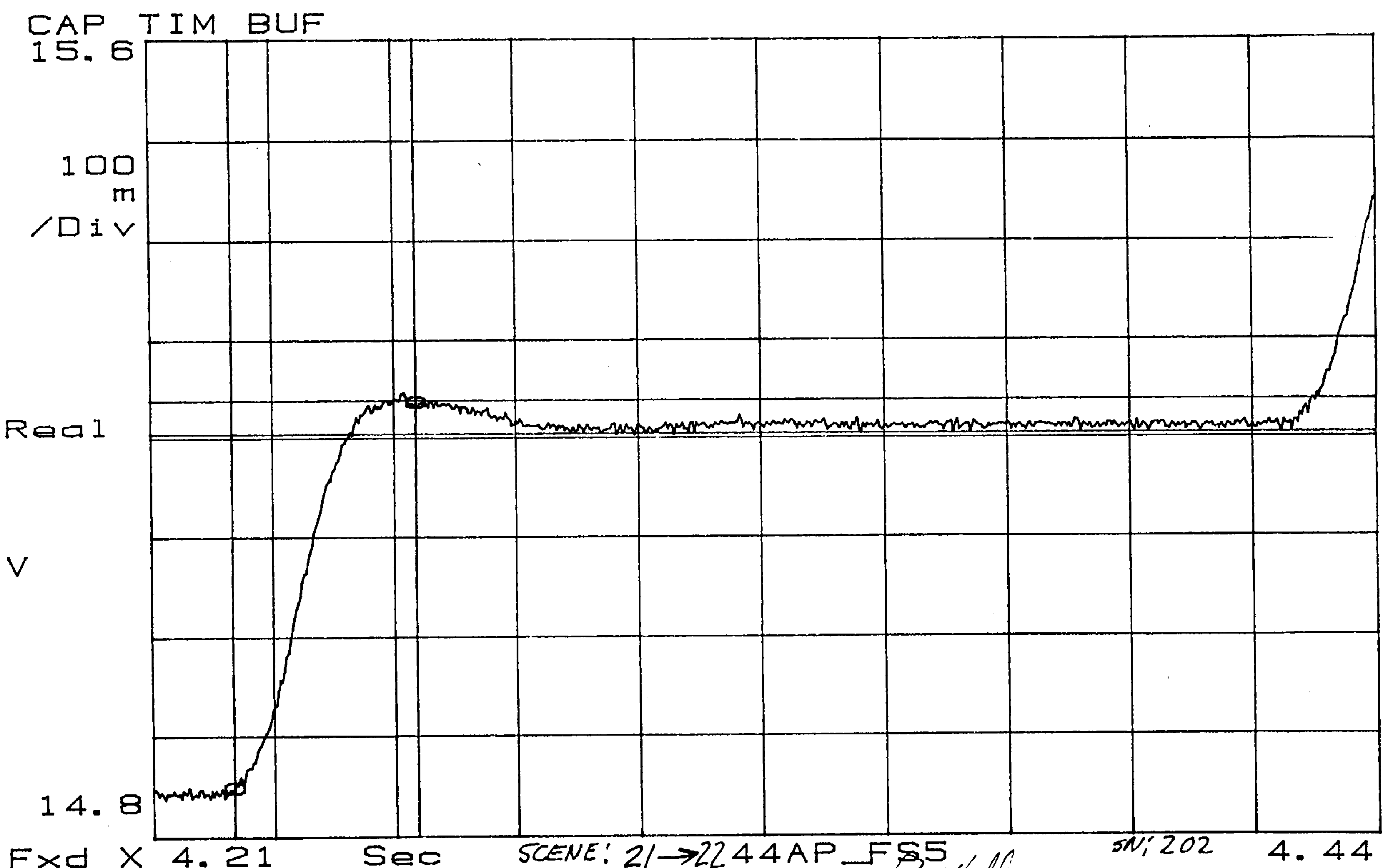
SCENE: 20 → 21 44AP_FS5 SN: 202

S/O: 298561 34.45—28 Test Eng: Date: 1-28-98

P/N: 1356008-1-1T A1-2 Quality: TAC 228 JAN 30 98 OP-0320

B54

X=4.221 S ΔX=35.16mS Y=15.2034 ΔY=35.88mV
Ya=14.8478 ΔYa=389.2mV



SCENE: 21→22 44AP_FS5 SN; 202

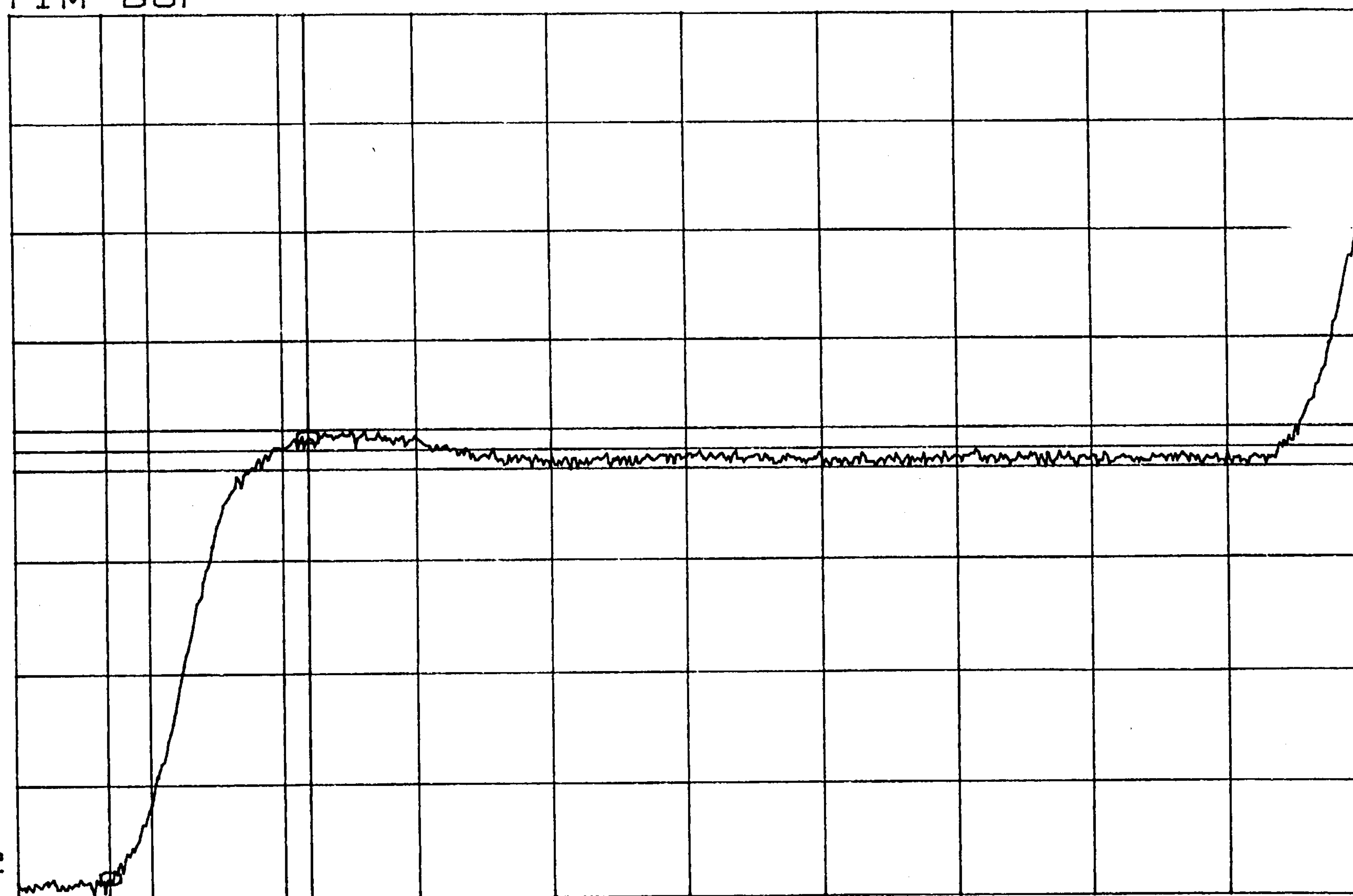
S/O: 298561 344.5-29 Test Eng: Ray [signature] Date: 1-28-98

P/N: 1356008-1-1T A1-2 Quality: 7A 228 JAN 30 98 of 0300

B55

X=4. 424 S   ΔX=35. 16mS   Y=15. 5811   ΔY=35. 88mV
Ya=15. 2176   ΔYa=392. 5mV

CAP TIM BUF



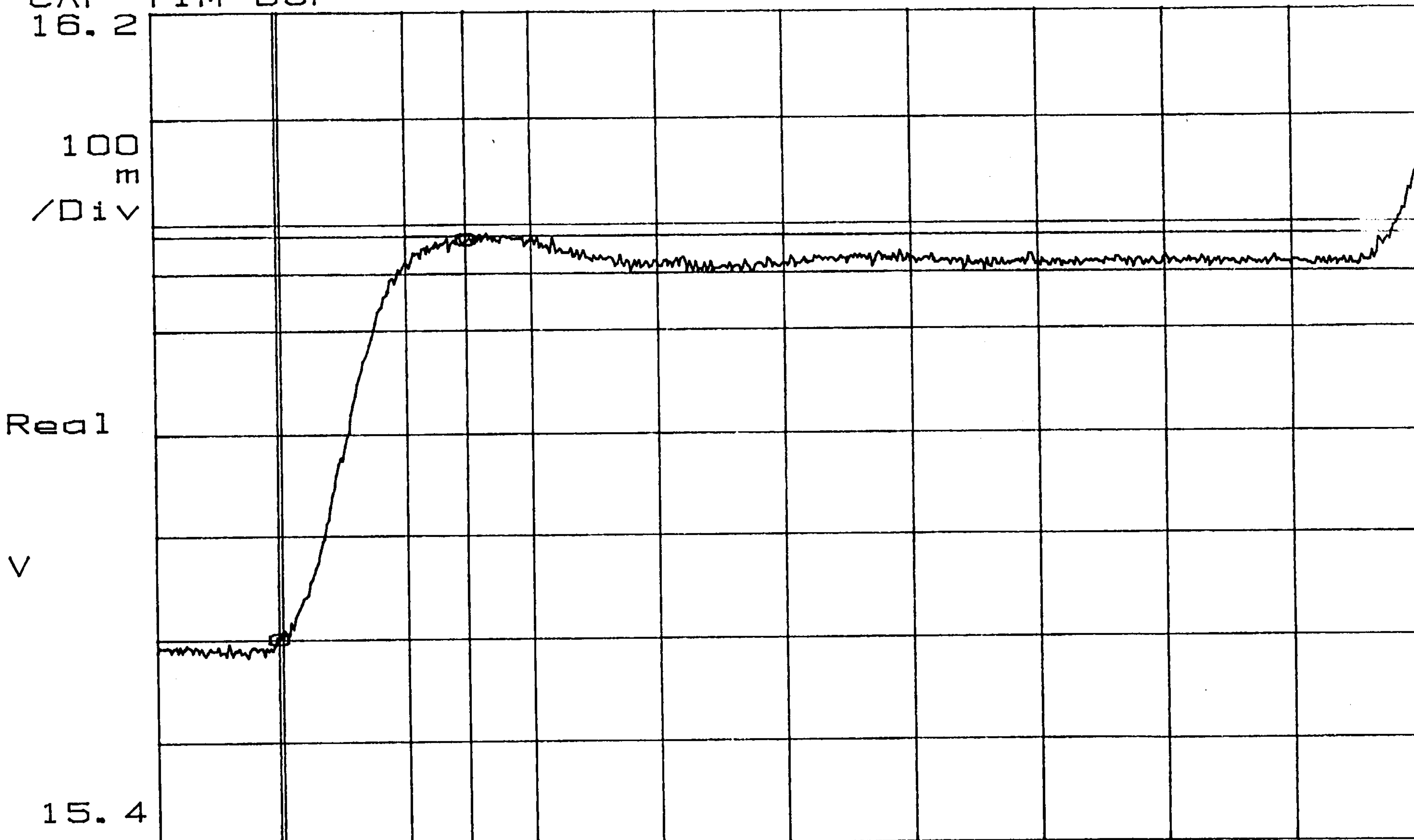
S/O: 298561   3.4.4.5 – 30   Test Eng: Ray [signature]   Date: 1-28-98

P/N: 1356008-1-1T   A1-2   Quality: [stamp] JAN 30 98   op-0320

B56

X=4.627 S ΔX=35.16mS Y=15.9522 ΔY=35.88mV
Ya=15.5987 ΔYa=386.0mV

CAP TIM BUF



SCENE: 23 → 24 44AP_FS5

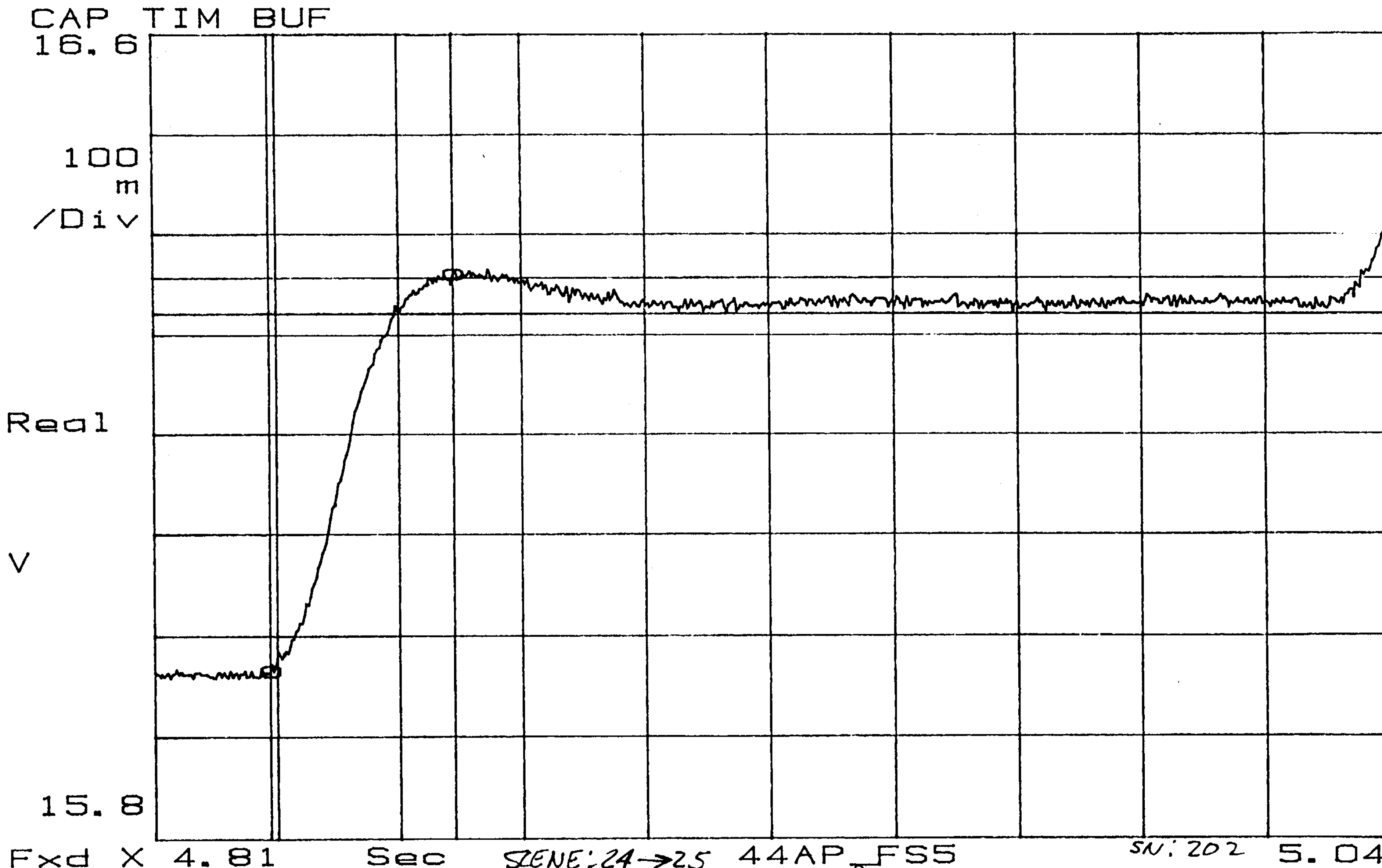
SN: 202

S/O: 298561 3.4.4.5_31 Test Eng: Ray [illegible] Date: 1-28-98

P/N: 1356008-1-IT A1-2 Quality: QA 226 JAN 30 98 op-0320

B57

X=4.829 S ΔX=35.16mS Y=16.3556 ΔY=35.88mV
Ya=15.9636 ΔYa=394.1mV

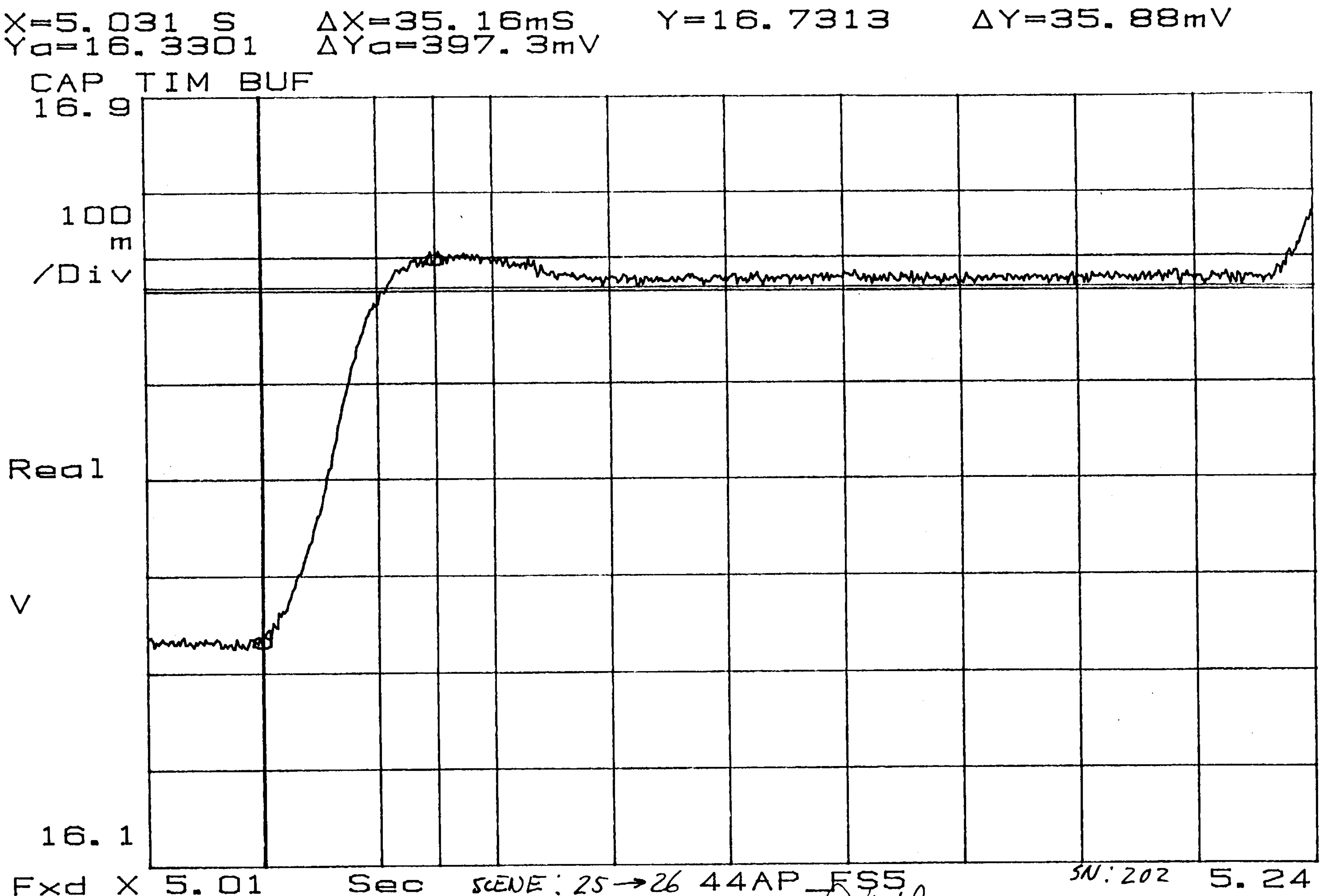


SCENE: 24→25 44AP FS5 SN: 202

S/O: 298561 3.4.4.6_32 Test Engr Ray [signature] Date: 1-28-98

P/N: 1356008-1-1T A1-2 Quality: 7A 228 JAN 30 98 op.0320

B58

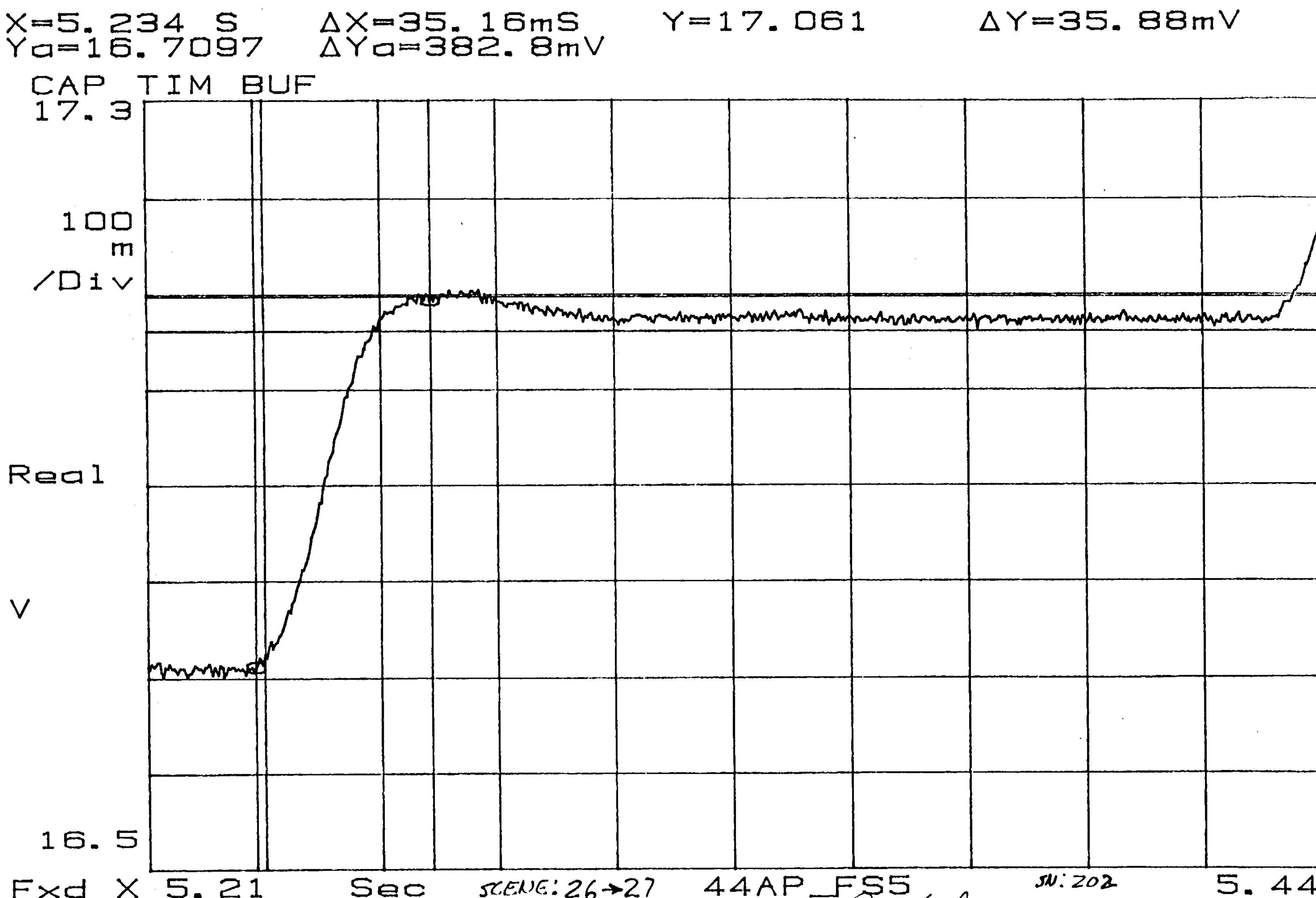


SCENE: 25→26 44AP_FS5 SN: 202

S/O: 298561 3.4.4.5_33 Test Eng: Date: 1-28-98

P/N: 1356008-1-1T AI-2 Quality: 7A 228 JAN 30 98 0P.0320

B59



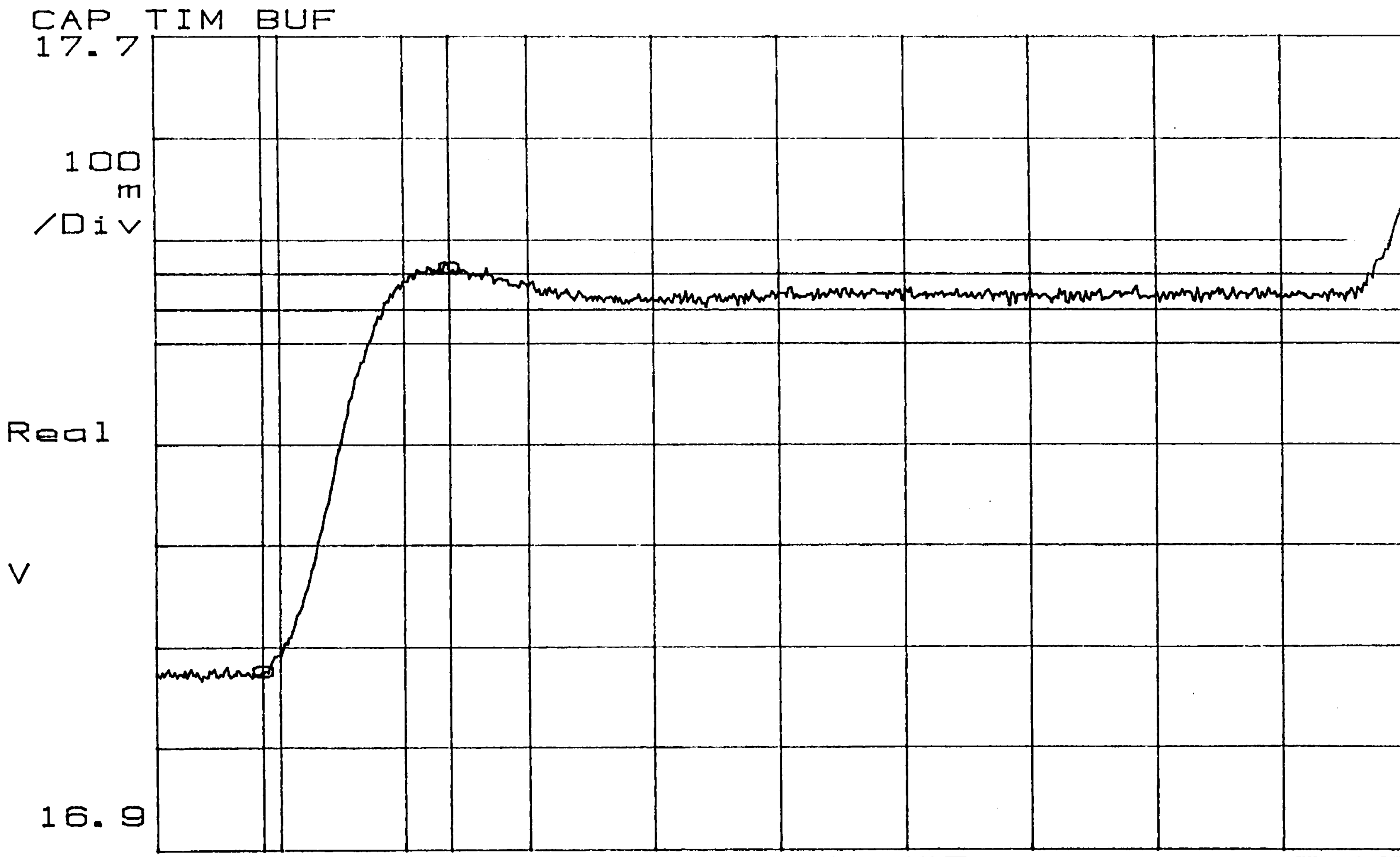
SCENE: 26→27 44AP_FS5 SN: 202

S/O: 298561 3.1.4.5-34 Test Eng: Ray [signature] Date: 1-28-98

P/N: 1356008-1-1T A1-2 Quality: 7A 228 JAN 30 98 Q 0320

B6C

X=5.436 S ΔX=35.16mS Y=17.4668 ΔY=35.88mV
Ya=17.0746 ΔYa=397.3mV



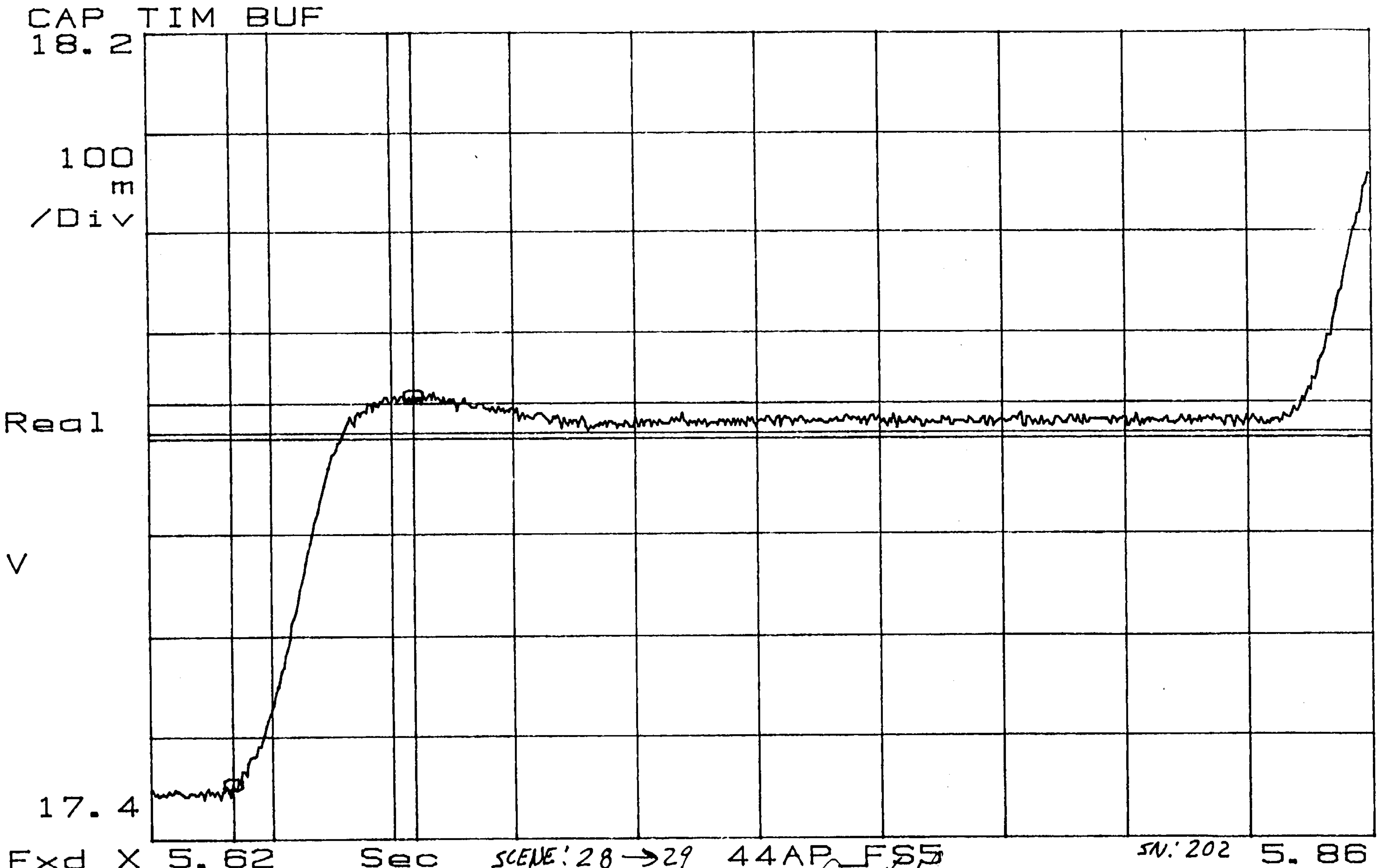
SCENE: 27→28 44AP_FS5 SN: 202

S/O: 298561 3.4.4.5_35 Test Eng: Ray [signature] Date: 1-28-98

P/N: 1356008-1-1T A1-2 Quality: 7A 228 OP.0320

B61

X=5.639 S ΔX=35.16mS Y=17.8296 ΔY=35.88mV
Ya=17.4541 ΔYa=382.8mV



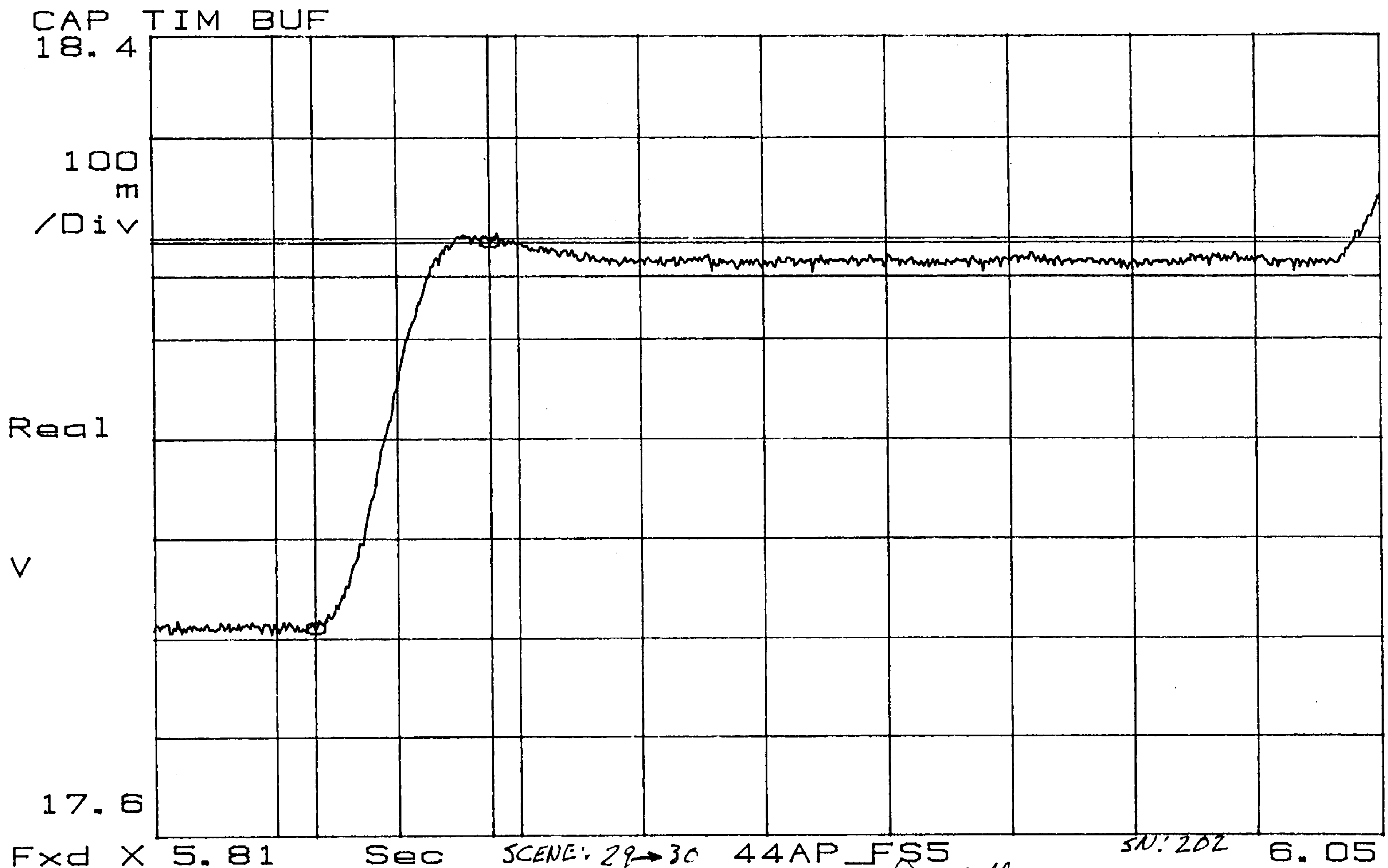
SCENE: 28 → 29 44AP_FS5 SN: 202

S/O: 298561 3.4.4.5_36 Test Eng: Ray [signature] Date: 1-28-98

P/N: 1356008-1-1T A1-2 Quality: JAN 30 98 Q-0320

B62

X=5. 84 S ΔX=35. 16mS Y=18. 1959 ΔY=35. 88mV
Ya=17. 8093 ΔYa=386. 0mV



SCENE: 29→30 44AP_FS5 SN: 202

S/O: 298561 3.4.4.6_37 Test Eng: [signature] Date: 1-28-98

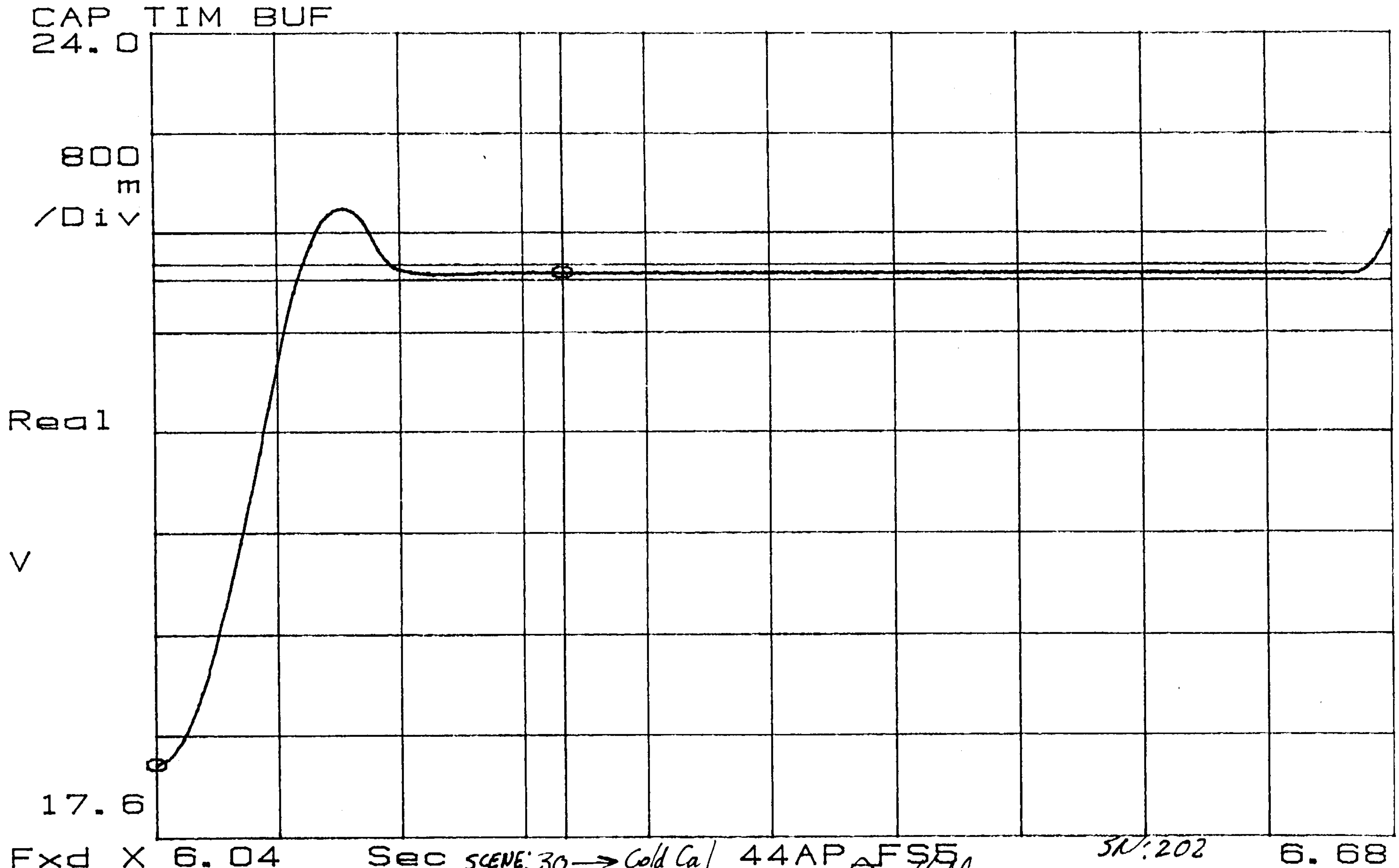
P/N: B56008-1-11 A1-2 Quality: 7A 228 [signature] QP-0320

B63

B64

This page has been intentionally left blank

X=6.042 S ΔX=210.9mS Y=22.1537 ΔY=131.9mV
Ya=18.1742 ΔYa=3.907 V

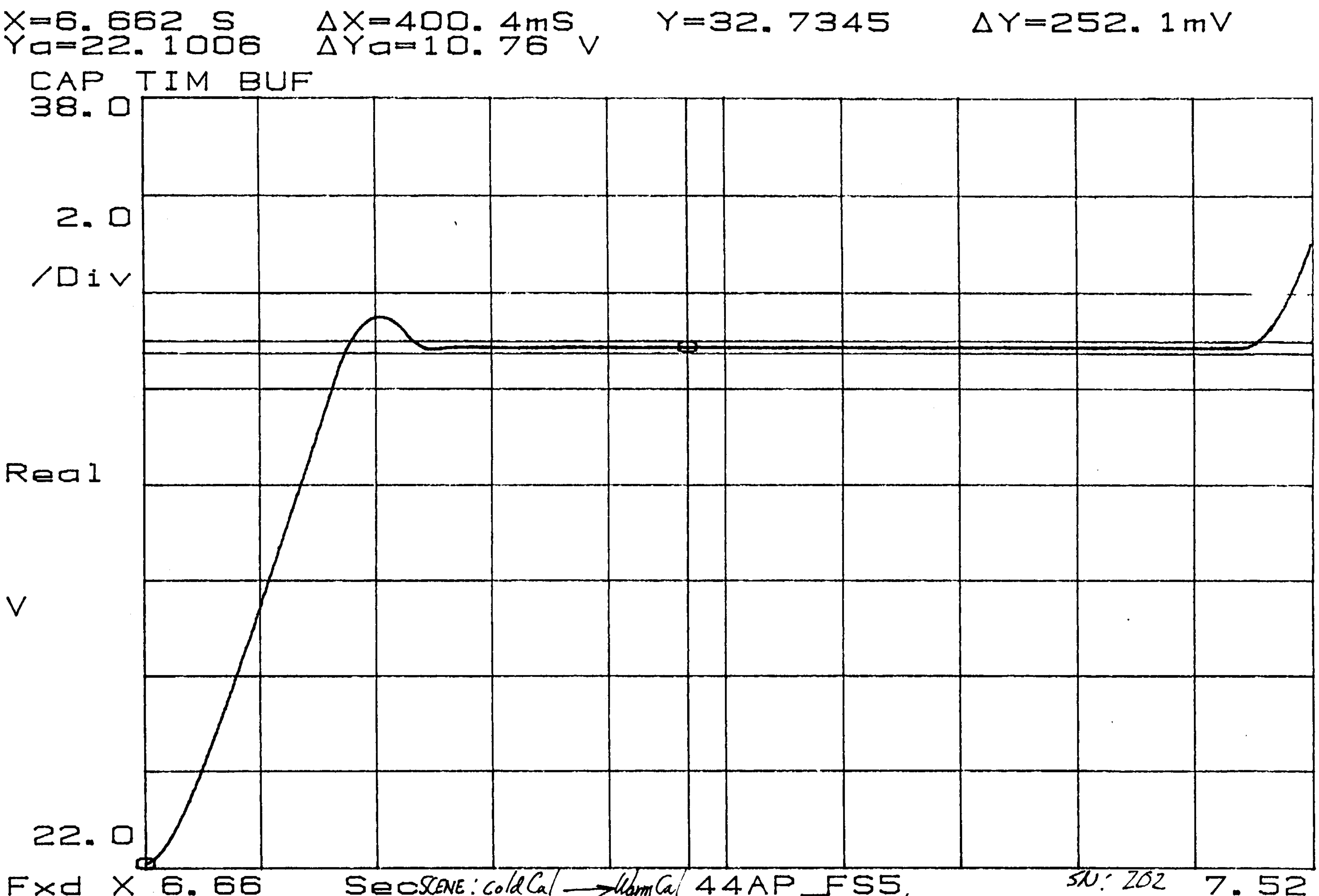


SCENE: 30 → Cold Cal 44AP FS5 SN: 202

S/O: 298561 3.4.4.5_38 Test Eng: Date: 1-28-98

P/N: 1356008-1-1T A1-2 Quality: JAN 30 98 op. 0320

B65



SCENE: Cold Cal → Warm Cal 44AP_FS5, SN: 202

S/o: 298561 3.445_39 Test Engr Kaye Eisenberg Date: 1-28-96

P/N: 356008-1-M A1-2 Quality: 220 JAN 30 98 QP-0320

B66

AE-26002/1C
2 Oct 97

TEST DATA SHEET 7 (Sheet 1 Of 4)
Scan Motion and Jitter Test (A1-1) (Paragraph 3.4.4.5)

Test Setup Verified: Ray Bentley 1-14-98 Signature

Shop Order No. 298561

Step No.	Description	Requirement	Test Result	Pass/Fail
7	--	Stepping Slewing <8 sec period per Figure ~~6~~ 8	<8.0 Sec	P
9	Scene 1-2 3.33° step	<35 msec rise time per Figure 7	< 35 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	<±5 % < 3%	P
10	Scene 2-3 3.33° step	<35 msec rise time per Figure 7	<35% m sec. <	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ±5% < 3 %	P
11	Scene 3-4 3.33° step	<35 msec rise time per Figure 7	< 35 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ±5% < 3%	P
12	Scene 4-5 3.33° step	<35 msec rise time per Figure 7	< 35 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ±5% < 3 %	P
13	Scene 5-6 3.33° step	<35 msec rise time per Figure 7	< 35 m sec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ±5% < 3 %	P
14	Scene 6-7 3.33° step	<35 msec rise time per Figure 7	< 35 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ±5% < 3 %	P
15	Scene 7-8 3.33° step	<35 msec rise time per Figure 7	< 35 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ±5% < 3 %	P
16	Scene 8-9 3.33° step	<35 msec rise time per Figure 7	< 35 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ±5% < 3%	P

Pass = P
Fail = F

TEST DATA SHEET 7 (Sheet 2 Of 4)
Scan Motion and Jitter Test (A1-1)

Step No.	Description	Requirement	Test Result	Pass/Fail
17	Scene 9-10 3.33° step	<35 msec rise time per Figure 7	< 35 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ±5 % < 3 %	P
18	Scene 10-11 3.33° step	<35 msec rise time per Figure 7	< 35 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ±5 % < 3 %	P
19	Scene 11-12 3.33° step	<35 msec rise time per Figure 7	< 35 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ±5 % < 3 %	P
20	Scene 12-13 3.33° step	<35 msec rise time per Figure 7	< 35 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ±5 % < 3 %	P
21	Scene 13-14 3.33° step	<35 msec rise time per Figure 7	< 35 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ±5 % < 3 %	P
22	Scene 14-15 3.33° step	<35 msec rise time per Figure 7	< 35 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ±5 % < 3 %	P
23	Scene 15-16 3.33° step	<35 msec rise time per Figure 7	< 35 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ±5 % < 3 %	P
24	Scene 16-17 3.33° step	<35 msec rise time per Figure 7	< 35 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ±5 % < 3 %	P

Pass = P
Fail = F

TEST DATA SHEET 7 (Sheet 3 Of 4)
Scan Motion and Jitter Test (A1-1)

Step No.	Description	Requirement	Test Result	Pass/Fail
25	Scene 17-18 3.33° step	<35 msec rise time per Figure 7	< 35 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ± 5 % < 3 %	P
26	Scene 18-19 3.33° step	<35 msec rise time per Figure 7	< 35 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ± 5 % < 3 %	P
27	Scene 19-20 3.33° step	<35 msec rise time per Figure 7	< 35 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ± 5 % < 3 %	P
28	Scene 20-21 3.33° step	<35 msec rise time per Figure 7	< 35 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ± 5 % < 3 %	P
29	Scene 21-22 3.33° step	<35 msec rise time per Figure 7	< 35 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ± 5 % < 3 %	P
30	Scene 22-23 3.33° step	<35 msec rise time per Figure 7	< 35 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ± 5 % < 3 %	P
31	Scene 23-24 3.33° step	<35 msec rise time per Figure 7	< 35 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ± 5 % < 3 %	P
32	Scene 24-25 3.33° step	<35 msec rise time per Figure 7	< 35 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ± 5 % < 3 %	P

Pass = P
Fail = F

TEST DATA SHEET 7 (Sheet 4 Of 4)
Scan Motion and Jitter Test (A1-1)

Step No.	Description	Requirement	Test Result	Pass/Fail
33	Scene 25-26 3.33° step	<35 msec rise time per Figure 7	< 35 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ±5% < 3%	P
34	Scene 26-27 3.33° step	<35 msec rise time per Figure 7	< 35 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ±5% < 3%	P
35	Scene 27-28 3.33° step	<35 msec rise time per Figure 7	< 35 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ±5% < 3%	P
36	Scene 28-29 3.33° step	<35 msec rise time per Figure 7	< 35 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ±5% < 3%	P
37	Scene 29-30 3.33° step	<35 msec rise time per Figure 7	< 35 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ±5% < 3%	P
38	Scene 30 Cold Cal 35.0° slew	<0.21 sec slew time per Figure 10	< 0.21 sec	P
		< ±0.165° jitter per Figure 11	< ± 0.165%	P
39	Cold Cal - Warm Cal 96.67° slew	<0.40 sec slew time per Figure 12	< 0.40 Sec	P
		< ±0.165° jitter per Figure 13	< ± 0.165%	P

Pass = P
Fail = F

Unit: 1356008-1-1T

Serial No.: 202

Date: 1-28-98

Test Engineer: [signature]

Quality Assurance: MAR 2 '98

Customer Representative: APR 1 '98

TEST DATA SHEET 8 (Sheet 1 Of 4)
Scan Motion and Jitter Test (A1-2) (Paragraph 3.4.4.5)

Test Setup Verified: Ray Berkhof
Signature
1-14-98

Shop Order No. 298561

Step No.	Description	Requirement	Test Result	Pass/Fail
44	--	Stepping Slewing <8 sec period per Figure ~~6~~ 8	< 8.0 Sec	P
9	Scene 1-2 3.33° step	<35 msec rise time per Figure 7	< 35 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ±5% < 3%	P
10	Scene 2-3 3.33° step	<35 msec rise time per Figure 7	< 35 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ±6% < 3%	P
11	Scene 3-4 3.33° step	<35 msec rise time per Figure 7	< 35 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ±5% < 3%	P
12	Scene 4-5 3.33° step	<35 msec rise time per Figure 7	< 35 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ±5% < 3%	P
13	Scene 5-6 3.33° step	<35 msec rise time per Figure 7	< 35 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ±5% < 3%	P
14	Scene 6-7 3.33° step	<35 msec rise time per Figure 7	< 35 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ±5% < 3%	P
15	Scene 7-8 3.33° step	<35 msec rise time per Figure 7	< 35 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ±5% < 3%	P
16	Scene 8-9 3.33° step	<35 msec rise time per Figure 7	< 35 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ±5% < 3%	P

Pass = P
Fail = F

TEST DATA SHEET 8 (Sheet 2 Of 4)
Scan Motion and Jitter Test (A1-2)

Step No.	Description	Requirement	Test Result	Pass/Fail
17	Scene 9-10 3.33° step	<35 msec rise time per Figure 7	< 35 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ±5% < 3%	P
18	Scene 10-11 3.33° step	<35 msec rise time per Figure 7	< 35 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ±5% < 3%	P
19	Scene 11-12 3.33° step	<35 msec rise time per Figure 7	< 35 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ±5% < 3%	P
20	Scene 12-13 3.33° step	<35 msec rise time per Figure 7	< 35 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ±5% < 3%	P
21	Scene 13-14 3.33° step	<35 msec rise time per Figure 7	< 35 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ±5% < 3%	P
22	Scene 14-15 3.33° step	<35 msec rise time per Figure 7	< 35 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ±5% < 3%	P
23	Scene 15-16 3.33° step	<35 msec rise time per Figure 7	< 35 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ±5% < 3%	P
24	Scene 16-17 3.33° step	<35 msec rise time per Figure 7	< 35 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ±5% < 3%	P

Pass = P
Fail = F

TEST DATA SHEET 8 (Sheet 3 Of 4)
Scan Motion and Jitter Test (A1-2)

Step No.	Description	Requirement	Test Result	Pass/Fail
25	Scene 17-18 3.33° step	<35 msec rise time per Figure 7	< 35msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ±5% < 3%	P
26	Scene 18-19 3.33° step	<35 msec rise time per Figure 7	< 35msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ±5% < 3%	P
27	Scene 19-20 3.33° step	<35 msec rise time per Figure 7	< 35msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ±5% < -3%	P
28	Scene 20-21 3.33° step	<35 msec rise time per Figure 7	< 35msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ±5% < 3%	P
29	Scene 21-22 3.33° step	<35 msec rise time per Figure 7	< 35msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ±5% < 3%	P
30	Scene 22-23 3.33° step	<35 msec rise time per Figure 7	< 35msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ±5% < 3%	P
31	Scene 23-24 3.33° step	<35 msec rise time per Figure 7	< 35msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ±5% < 3%	P
32	Scene 24-25 3.33° step	<35 msec rise time per Figure 7	< 35msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ±5% < 3%	P

Pass = P
Fail = F

TEST DATA SHEET 8 (Sheet 4 Of 4)
Scan Motion and Jitter Test (A1-2)

Step No.	Description	Requirement	Test Result	Pass/Fail
33	Scene 25-26 3.33° step	<35 msec rise time per Figure 7	< 35 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ± 5 % < 3 %	P
34	Scene 26-27 3.33° step	<35 msec rise time per Figure 7	< 35 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ± 5 % < 3 %	P
35	Scene 27-28 3.33° step	<35 msec rise time per Figure 7	< 35 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ± 5 % < 3 %	P
36	Scene 28-29 3.33° step	<35 msec rise time per Figure 7	< 35 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ± 5 % < 3 %	P
37	Scene 29-30 3.33° step	<35 msec rise time per Figure 7	< 35 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ± 5 % < 3 %	P
38	Scene 30 Cold Cal 35.0° slew	<0.21 sec slew time per Figure 10	< 0.210 sec	P
		< ±0.165° jitter per Figure 11	< ± 0.165 %	P
39	Cold Cal - Warm Cal 96.67° slew	<0.40 sec slew time per Figure 12	< 0.40 sec	P
		< ±0.165° jitter per Figure 13	< ± 0.165 %	P

Pass = P
Fail = F

Unit: 1356008-1-1T

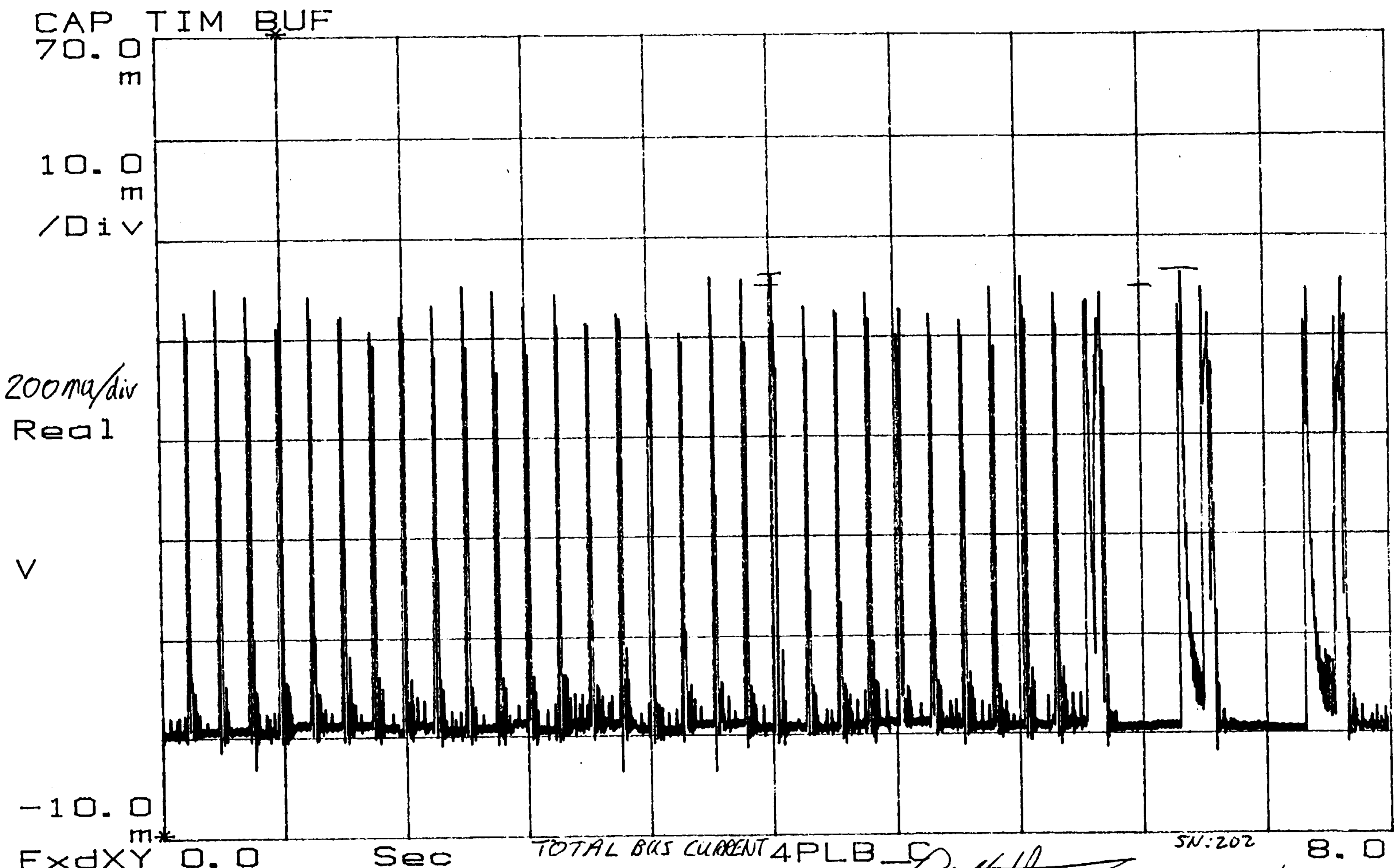
Serial No.: 202

Date: 1-28-98

Test Engineer: [signature] MAR 2 '98

Quality Assurance: 892 V2

Customer Representative: APR 1 '98



S/O: 298561

P/N: 1356008-1-1T

3.4.4.6_4

Test Eng:

Quality: 7A 228 ... 98 of 0320

Date: 1-28-98

C1

C2

TEST DATA SHEET 9
28V Bus Peak Current and Rise Time Test (Paragraph 3.4.4.6)

Test Setup Verified: Ray Bergberg
Signature

Shop Order No. 298561

Step No.	Requirement	Test Result	Pass/Fail
4	< 1 A peak any place in the scan	940 ma	P
5	> 35 μsec rise time, 3.33° step	1.562 msec	P
6	> 35 μsec rise time, start of WC slew	1.953 msec	P
6	> 35 μsec rise time, end of WC slew	1.562 msec	P

Pass = P
Fail = F

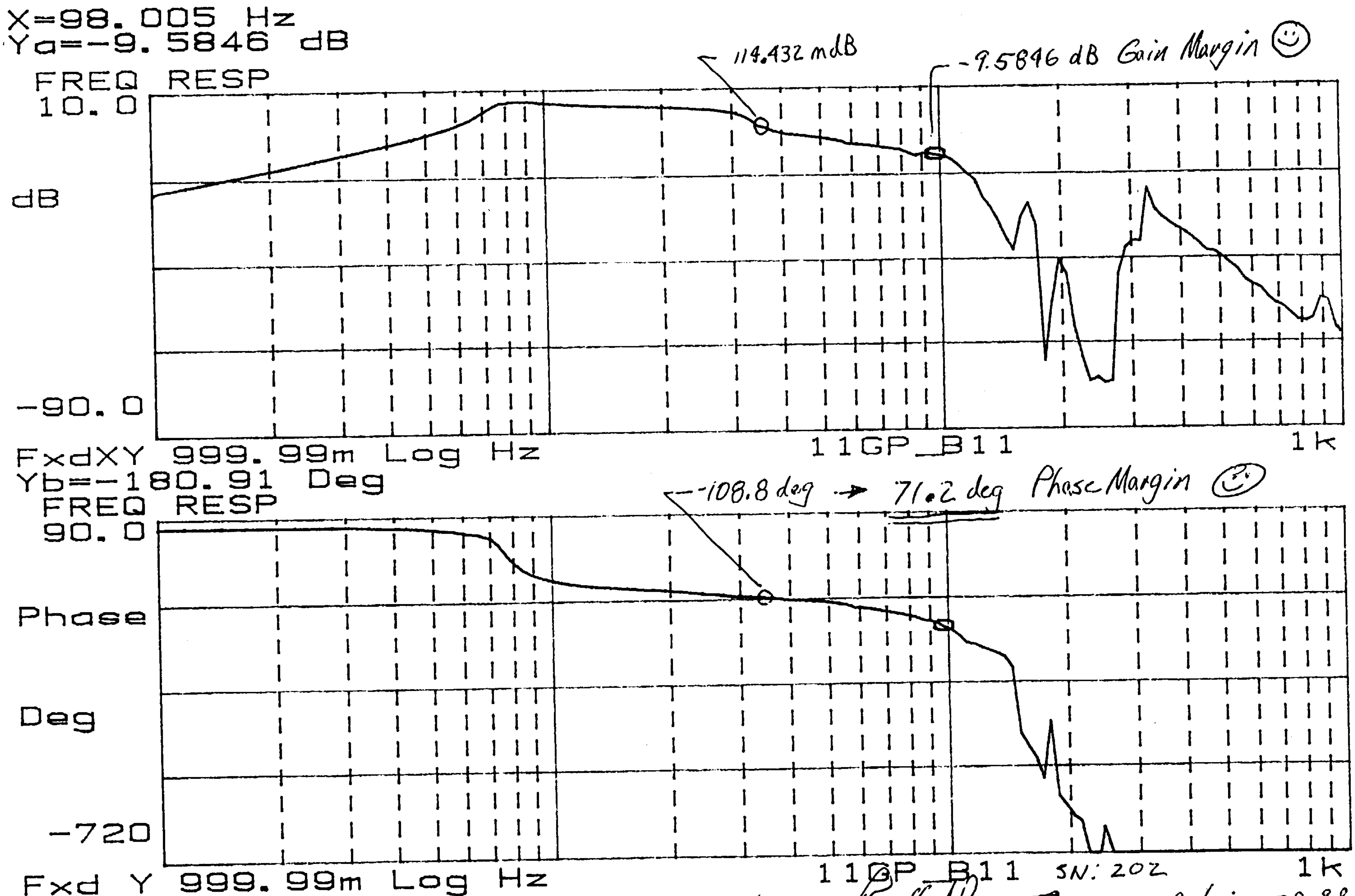
Unit: BS6008-1-1T

Serial No.: 202

Test Engineer: Ray Bergberg

Quality Assurance: 892 VZ MAR 2 '98

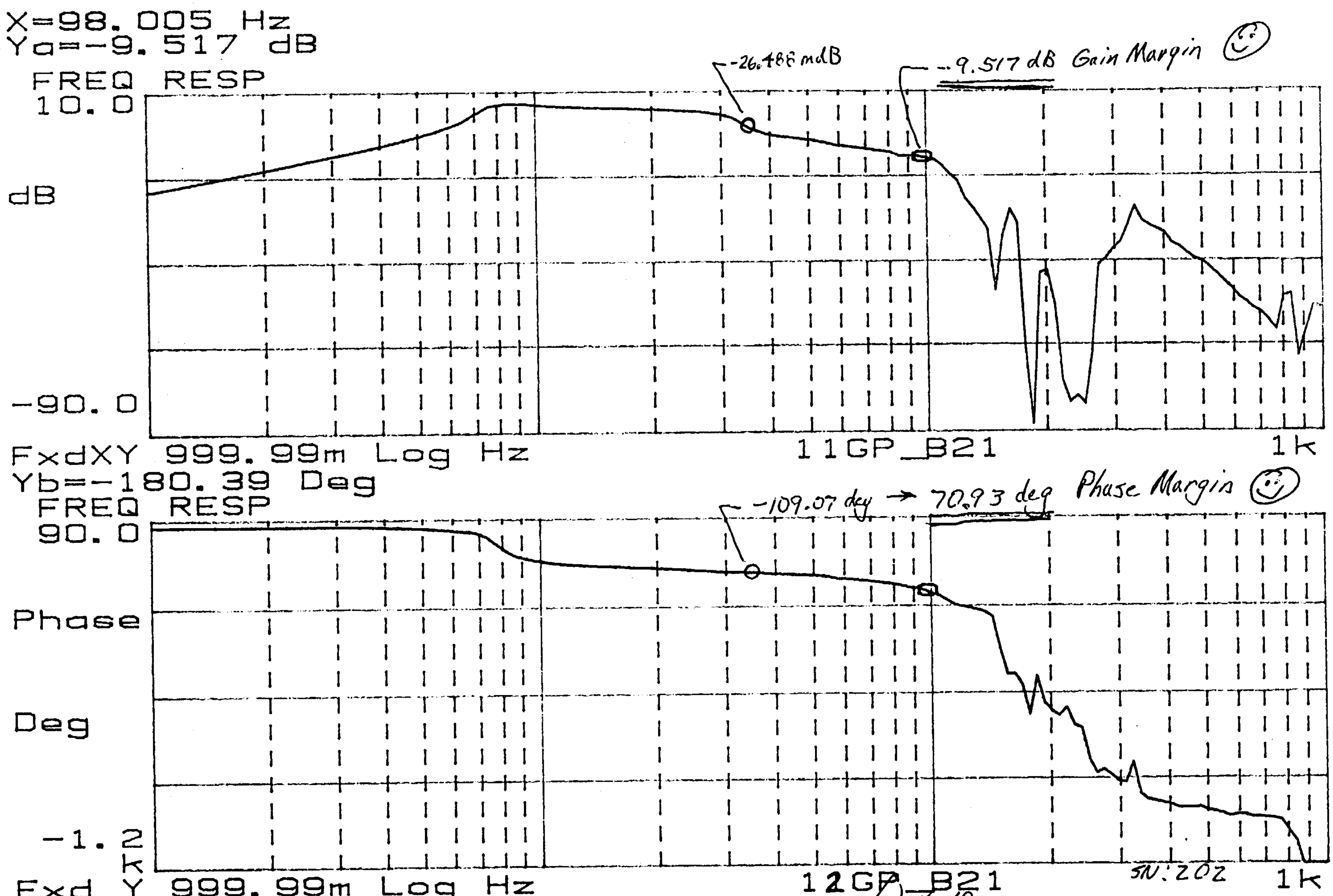
Date: 1-20-98



S/O: 278561
P/N: 1356008-1-1T

3.4.4.8—11
A1-1
Gain/Phase Margin (first Run)

Test Eng: [signature] Date: 1-28-98
Quality: [stamp] QP.032

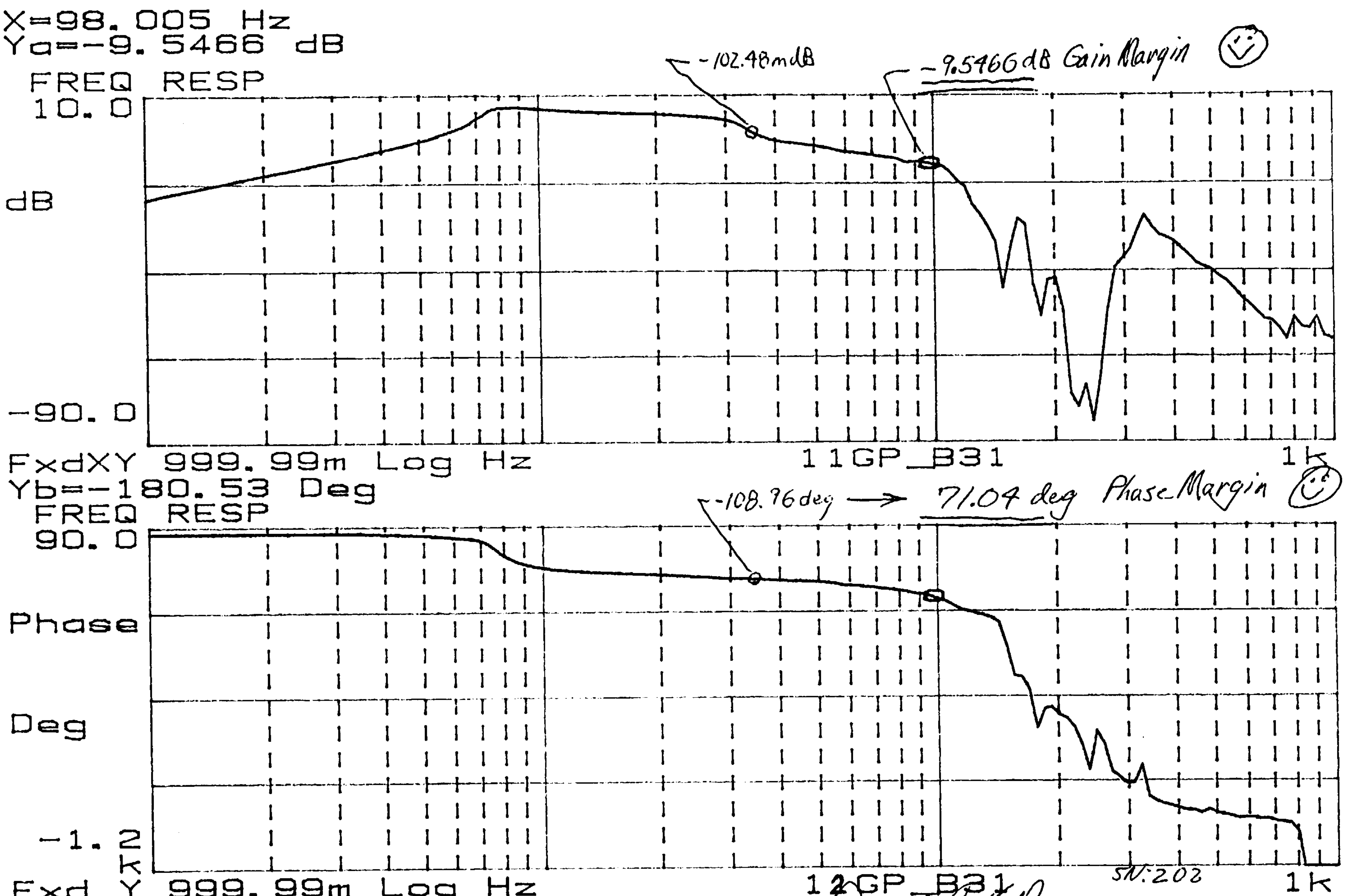


S/O: 298561
P/N: 1356008-1-1T

3448_12
Gain/Phase Margin
A1-1 (Second Run)

Test Eng: [signature] Date: 1-29-98
Quality: [signature] 228 JAN 30 98 ~~QP-0320~~

DZ



S/O: 298561 3.4.4.8_12 Test Eng: Raymond L. [signature] Date: 1-29-98

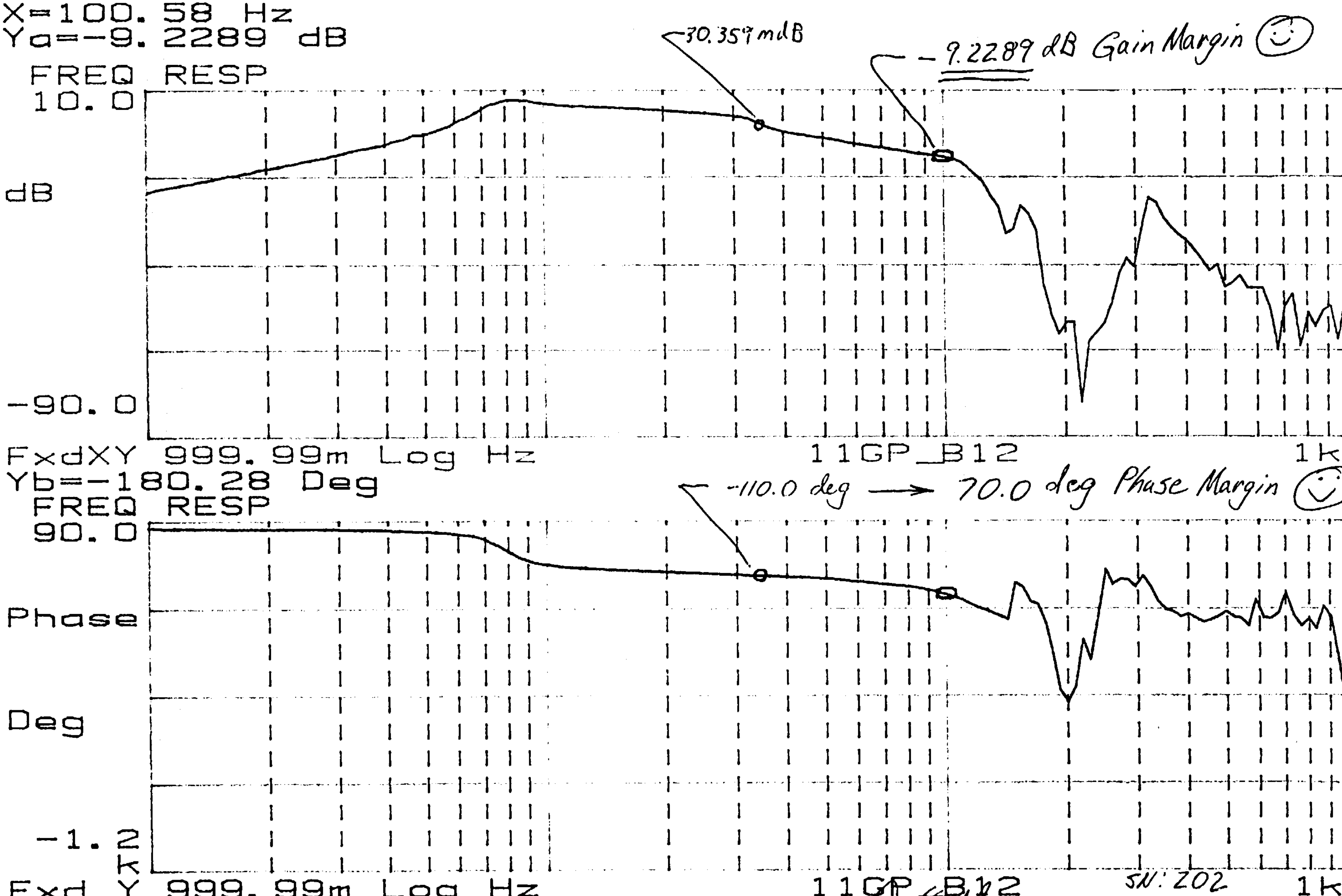
P/N: 1356008-1-1T Gain/Phase Margin Quality: QA 228 JAN 30 98 OP0320

A1-1 (third Run)

SN: 202

D3

X=100.58 Hz
Ya=-9.2289 dB



S/O: 298561

P/N: 1356008-1-1T

3.4.4.8_11

Gain/Phase Margin

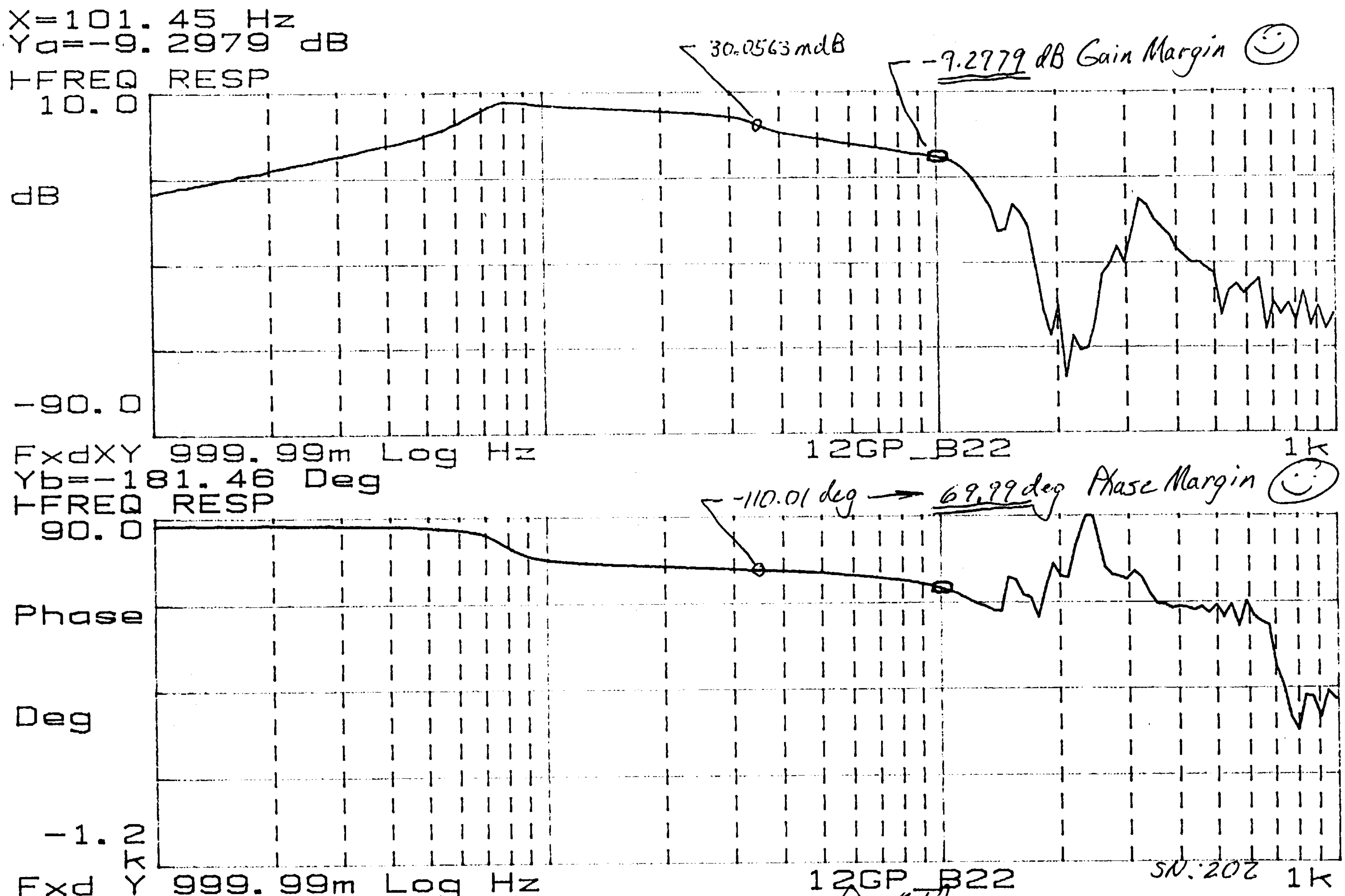
A1-2 (First Run)

Test Eng:

Quality: TA 228 JAN 30 98 of 0320

Date: 1-29-98

D4



S/O: 298561

P/N: 1356008-1-1T

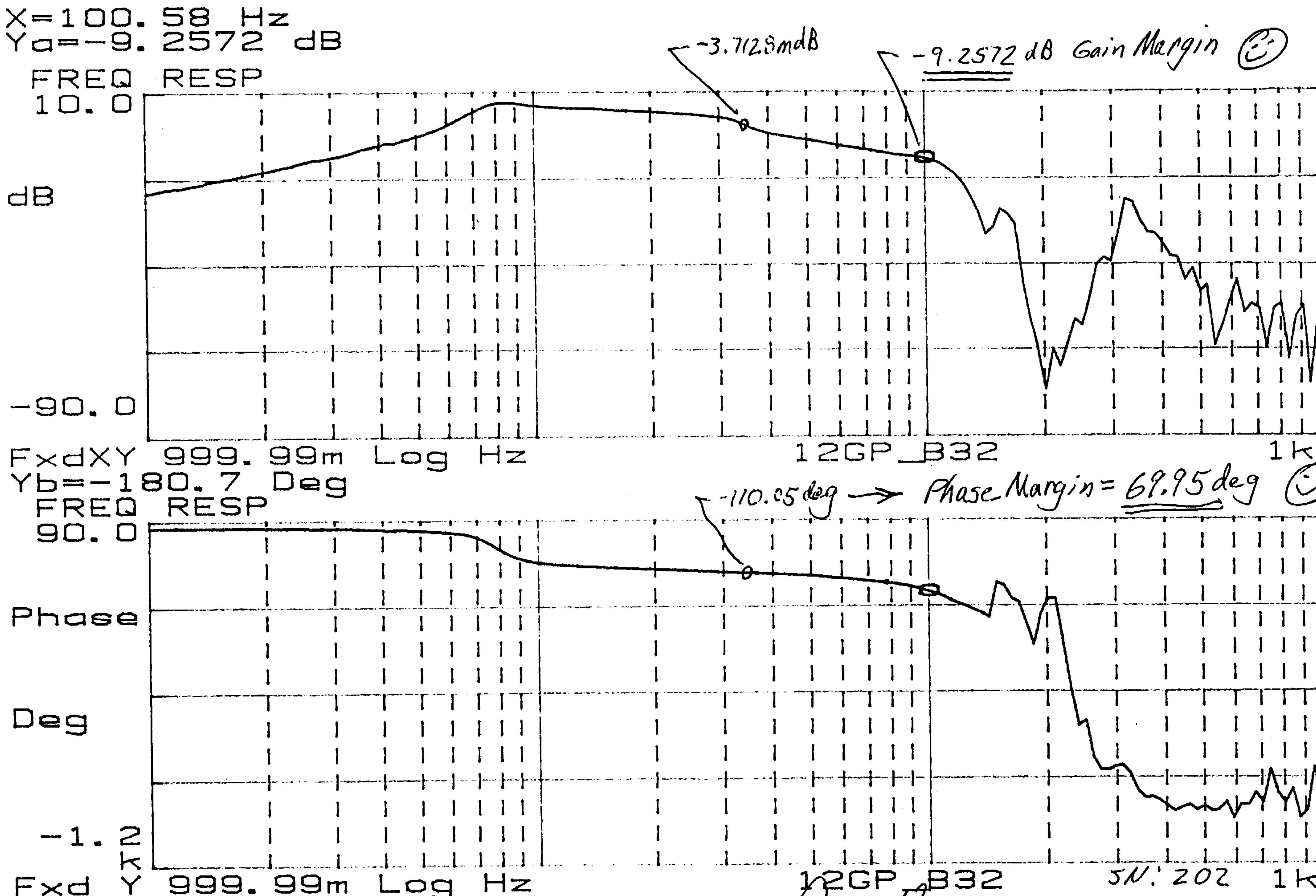
3.4.4.8_12
Gain/Phase Margin
A1-2 (Second Run)

Test Eng: [signature]

Quality: [signature] QP-0320

Date: 1-29-98

D5



S/O: 298561

P/N: 1356008-1-1T

3.4.4.8_12
Gain/Phase Margin
A1-2 (Third Run)

Test Eng: [signature]

Quality: [stamp] 0320

Date: 1-29-98

D6

TEST DATA SHEET 10
Gain/Phase Margin (A1-1) (Paragraph 3.4.4.8)

Test Setup Verified: [signature] Signature

Shop Order No. 298 561

Temperature: 71.5 °F ~~°C~~

Requirement		Test Result	Pass/Fail
9.2 dB minimum	1	-9.5846 dB	P
	2	-9.517 dB	P
	3	-9.5466 dB	P
	~~4~~		
	~~5~~		
25 degrees minimum	1	71.2 Deg	P
	2	70.93 Deg	P
	3	71.04 Deg	P
	~~4~~		
	~~5~~		

DELETED PER CUSTOMER REQUEST 1-21-98 [signature]

Pass = P
Fail = F

Unit: 1356008-1-17

Serial No.: 202

Date: 1-20-98

Test Engineer: [signature]

Quality Assurance: MAR 2 '98

Customer Representative: MAR 1 '98

AE-26002/1C
2 Oct 97

TEST DATA SHEET 11
Gain/Phase Margin (A1-2) (Paragraph 3.4.4.8)

Test Setup Verified: Ray Bergberg
Signature

Shop Order No. 298561

Temperature: 72.3 °F ~~°C~~

Requirement	Test Result		Pass/Fail
9.2 dB minimum	1	-9.2289 dB	P
	2	-9.2979 dB	P
	3	-9.2572 dB	P
	4		
	5		
25 degrees minimum	1	70.00 Deg	P
	2	69.99 Deg	P
	3	69.75 Deg	P
	4		
	5		

DELETED PER CUSTOMER REQUEST Ray Bergberg 1-21-98

Pass = P
Fail = F

Unit: 1356008-1-1T

Serial No.: 202

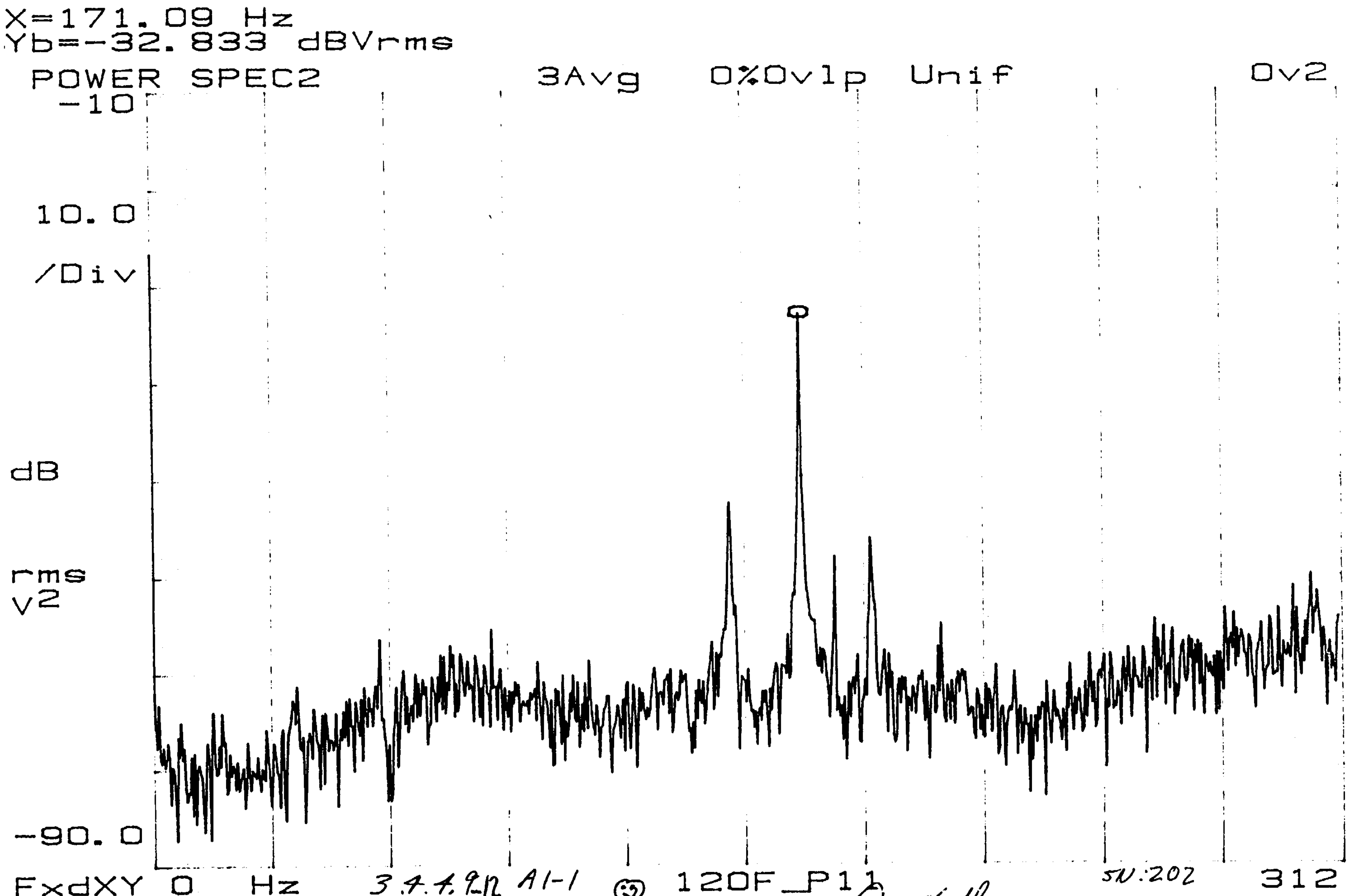
Date: 1-22-98

Test Engineer: Ray Bergberg

Quality Assurance: 268 MAR 2 '98

Customer Representative: MAR 1 '98

E1



S/O: 298561

P/N: 1356008-1-1T

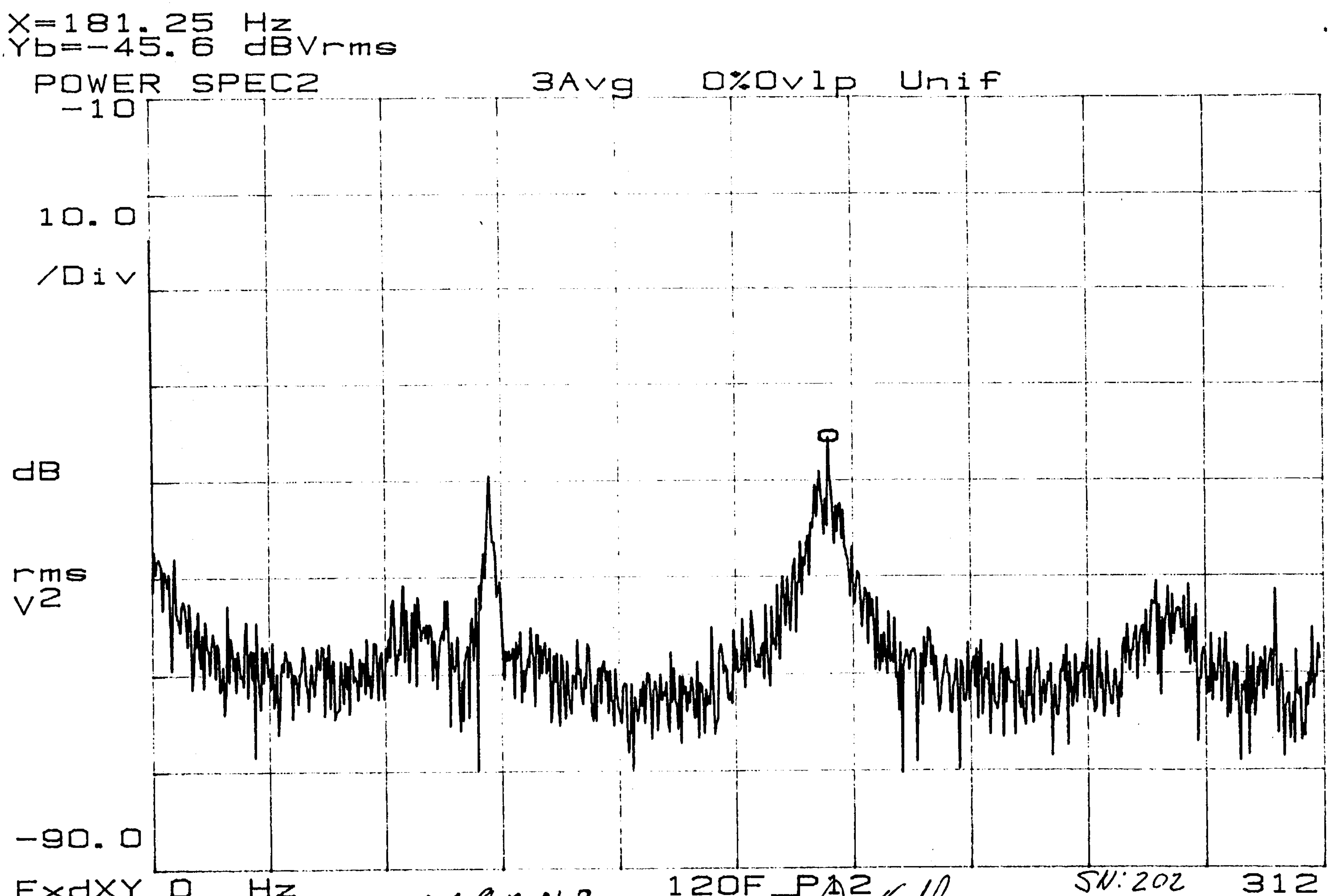
Gain Margin = 8.5597 dB

Rpot = 36.94 KΩ

R5B = 20 KΩ

Test Eng: Ray [signature] Date: 1-29-98

Quality: 7A 228 JAN 30 98 0320



SN: 202

3.4.4.9_12 A1-2

S/O: 298561

P/N: 1356008-1-17

Gain Margin = 8.1dB

R pot = 34.16 KΩ

R 56 = 20 KΩ

Test Eng: Ray

Quality:

Date: 1-29-98

7A 220 JAN 30 98 0.0320

E2

TEST DATA SHEET 12

Operational Gain Margin (A1-1) (Paragraph 3.4.4.9)

Test Setup Verified: Ray Hultberg Signature 1-29-98   Shop Order No. 298561

Temperature: 70.3 °F ~~°C~~

Step No.	Requirement		Test Result	Pass/Fail
11	R58 Resistance (kohms)			P
	Test Pot Resistance (kohms)	1	36.01 KΩ	
		2	36.01 KΩ	
		3	36.03 KΩ	
12	Oscillation Frequency (Hz)	1	171.09 Hz	P
		2	171.09 Hz	
		3	171.09 Hz	
16	Gain Margin, 8 dB minimum	1	8.5597 dB	P
		2	8.4216 dB	
		3	8.4246 dB	

Pass = P
Fail = F

Unit: 1356008-1-1T

Serial No.: 202

Test Engineer: Ray Hultberg

Quality Assurance: 7A 268 MAR 2 '98

Date: 1-29-98

AE-26002/1C
2 Oct 97

TEST DATA SHEET 13

Operational Gain Margin (A1-2) (Paragraph 3.4.4.9)

Test Setup Verified: Ray Hertzberg
Signature 1-29-98

Shop Order No. 298561

Temperature: 70.3 °F ~~°C~~

Step No.	Requirement		Test Result	Pass/Fail
11	R58 Resistance (kohms)			P
	Test Pot Resistance (kohms)	1	34.16 KΩ	
		2	~~181.25 Hz~~ 37.67 KΩ	
		3 1-29-98	34.32 KΩ	
12	Oscillation Frequency (Hz)	1	181.25 Hz	P
		2	181.25 Hz	
		3	180.08 Hz	
16	Gain Margin, 8 dB minimum	1	8.1401 dB	P
		2	8.6667 dB	
		3	8.1648 dB	

Pass = P
Fail = F

Unit: 1356008-1-1T

Serial No.: 202

Test Engineer: Ray Hertzberg

Quality Assurance: 268 3-2-98

Date: 1-29-98

NASA
National Aeronautics and Space Administration

Report Documentation Page

1. Report No. ---	2. Government Accession No. ---	3. Recipient's Catalog No. ---
4. Title and Subtitle: Integrated Advanced Microwave Sounding Unit-A (AMSU-A), Performance Verification Report		5. Report Date: July 1998 6. Performing Organization Code: ---
7. Author(s): A. Nieto		8. Performing Organization Report No.: 11183 10. Work Unit No.: ---
9. Performing Organization Name and Address: Aerojet, 1100 W. Hollyvale, Azusa, CA 91702		11. Contract or Grant No.: NAS 5-32314
12. Sponsoring Agency Name and Address: NASA, Goddard Space Flight Center, Greenbelt, Maryland 20771		13. Type of Report and Period Covered: Final 14. Sponsoring Agency Code: ---
15. Supplementary Notes: ---		

16. ABSTRACT (*Maximum 200 words*)

This is the Performance Verification Report, EOS AMSU-A1 Antenna Drive Subassy, P/N 1356008-1, S/N 202 for the Integrated Advanced Microwave Sounding Unit-A (AMSU-A).

17. Key Words (Suggested by Author(s)): EOS, Microwave System		18. Distribution Statement: Unclassified --- Unlimited	
19. Security Classif. (of this report): Unclassified	20. Security Classif. (of this page): Unclassified	21. No. of pages	22. Price: ---

NASA FORM 1626 OCT 86

PREPARATION OF THE REPORT DOCUMENTATION PAGE

The last page of a report facing the third cover is the Report Documentation Page, RDP. Information presented on this page is used in announcing and cataloging reports as well as preparing the cover and title page. Thus, it is important that the information be correct. Instructions for filing in each block of the form are as follows:

Block 1. Report No. NASA report series number, if preassigned.

Block 2. Government Accession No. Leave blank.

Block 3. Recipient's Catalog No.. Reserved for use by each report recipient.

Block 4. Title and Subtitle. Typed in caps and lower case with dash or period separating subtitle from title.

Block 5. Report Date. Approximate month and year the report will be published.

Block 6. Performing Organization Code . Leave blank.

Block 7. Authors. Provide full names exactly as they are to appear on the title page. If applicable, the word editor should follow a name.

Block 8. Performing Organization Report No. NASA installation report control number and, if desired, the non-NASA performing organization report control number.

Block 9. Performing Organization Name and Address. Provide affiliation (NASA program office, NASA installation, or contractor name) of authors.

Block 10. Work Unit No. Provide Research and Technology Objectives and Plants (RTOP) number.

Block 11. Contract or Grant No. Provide when applicable.

Block 12. Sponsoring Agency Name and Address. National Aeronautics and Space Administration, Washington, D.C. 20546-0001. If contractor report, add NASA installation or HQ program office.

Block 13. Type of Report and Period Covered. NASA formal report series; for Contractor Report also list type (interim, final) and period covered when applicable.

Block 14. Sponsoring Agency Code. Leave blank.

Block 15. Supplementary Notes. Information not included elsewhere: affiliation of authors if additional space is required for Block 9, notice of work sponsored by another agency, monitor of contract, information about supplements (file, data tapes, etc.) meeting site and date for presented papers, journal to which an article has been submitted, note of a report made from a thesis, appendix by author other than shown in Block 7.

Block 16. Abstract. The abstract should be informative rather than descriptive and should state the objectives of the investigation, the methods employed (e.g., simulation, experiment, or remote sensing), the results obtained, and the conclusions reached.

Block 17. Key Words. Identifying words or phrases to be used in cataloging the report.

Block 18. Distribution Statement. Indicate whether report is available to public or not. If not to be controlled, use "Unclassified-Unlimited." If controlled availability is required, list the category approved on the Document Availability Authorization Form (see NHB 2200.2, Form FF427). Also specify subject category (see "Table of Contents" in a current issue of STAR) in which report is to be distributed.

Block 19. Security Classification (of the report). Self-explanatory.

Block 20. Security Classification (of this page). Self-explanatory.

Block 21. No. of Pages. Count front matter pages beginning with iii, text pages including internal blank pages, and the RDP, but not the title page or the back of the title page.

Block 22. Price Code. If Block 18 shows "Unclassified-Unlimited," provide the NTIS price code (see "NTIS Price Schedules" in a current issue of STAR) and at the bottom of the form add either "For sale by the National Technical Information Service, Springfield, VA 22161-2171" or "For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402-0001," whichever is appropriate.

REPORT DOCUMENTATION PAGE	*Form Approved OMB No. 0704-0188*

1. AGENCY USE ONLY (*Leave blank*)	2. REPORT DATE	3. REPORT TYPE AND DATES COVERED

4. TITLE AND SUBTITLE Integrated Advanced Microwave Sounding Unit-A (AMSU-A), Performance Verification Report	5. FUNDING NUMBERS NAS 5-32314
6. AUTHOR(S) A. Nieto	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Aerojet 1100 W. Hollyvale Azusa, CA 91702	8. PERFORMING ORGANIZATION REPORT NUMBER 11183 July 1998
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES) NASA Goddard Space Flight Center Greenbelt, Maryland 20771	10. SPONSORING/MONITORING AGENCY REPORT NUMBER ---
11. SUPPLEMENTARY NOTES ---	
12a. DISTRIBUTION/AVAILABILITY STATEMENT ---	12b. DISTRIBUTION CODE ---

13. ABSTRACT (*Maximum 200 words*)

This is the Performance Verification Report, EOS AMSU-A1 Antenna Assy, P/N 1356008-1, S/N 202 for the Integrated Advanced Microwave Sounding Unit-A (AMSU-A).

14. SUBJECT TERMS EOS Microwave System	15. NUMBER OF PAGES
	16. PRICE CODE ---

17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT
Unclassified	Unclassified	Unclassified	SAR

GENERAL INSTRUCTIONS FOR COMPLETING SF 298

The Report Documentation Page (RDP) is used in announcing and cataloging reports. It is important that this information be consistent with the rest of the report, particularly the cover and title page. Instructions for filing in each block of the form follow. It is important to stay within the lines to meet optical scanning requirements.

Block 1. Agency Use Only (*Leave blank*)

Block 2. Report Date. Full publication date including day, month, and year, if available (e.g., 1 Jan 88). Must cite at least the year.

Block 3. Type of Report and Dates Covered. State whether report is interim, final, etc. If applicable, enter inclusive report dates (e.g., 10 Jun 87 - 30 Jun 88).

Block 4. Title and Subtitle. A title is taken from the part of the report that provides the most meaningful and complete information. When a report is prepared in more than one volume, report the primary title, add volume number, and include subtitle for the specific volume. On classified documents enter the title classification in parentheses.

Block 5. Funding Numbers. To include contract and grant numbers; may include program element number(s), project number(s), task number(s), and work unit number(s). Use the following labels:

C	- Contract	PR	- Project
G	- Grant	TA	- Task
PE	- Program Element	WU	- Work Unit Accession No.

Block 6. Author(s). Name(s) of person(s) responsible for writing the report, performing the research, or credited with the content of the report. If editor or compiler, this should follow the name(s).

Block 7. Performing Organization Name(s) and Address(es). Self-explanatory.

Block 8. Performing Organization Report Number. Enter the unique alphanumeric report number(s) assigned by the organization performing the report.

Block 9. Sponsoring/Monitoring Agency Name(s) and Address(es). Self-explanatory.

Block 10. Sponsoring/Monitoring Agency Reports Number. (*If known*).

Block 11. Supplementary Notes. Enter information not included elsewhere such as: Prepared in cooperation with...; Trans. of ...; To be published in ... When a report is revised, include a statement whether the new report supersedes or supplements the older report.

Block 12.a Distribution/Availability Statement. Denotes public availability or limitations. Cite any availability to the public. Enter additional limitations or special markings in all capitals (e.g., NOFORN, REL, ITAR).

DOD - See DoDD 5230.24 *Distribution Statement on Technical Documents*
DOE - See authorities.
NASA - See Handbook NHB 2200.2.
NTIS - Leave blank.

Block 12.b Distribution Code.

DOD - Leave blank.
DOE - Enter DOE distribution categories from the standard Distribution for Unclassified Scientific and Technical Reports.
NASA - Leave blank.
NTIS - Leave blank.

Block 13. Abstract. Include a brief (*Maximum 200 words*) factual summary of the most significant information contained in the report.

Block 14. Subject Terms. Keywords or phases identifying major subjects in the report.

Block 15. Number of Pages. Enter the total number of pages.

Block 16. Price Code. Enter appropriate price code (*NTIS only*).

Block 17 - 19. Security Classifications. Self-explanatory. Enter U.S. Security Classification in accordance with U.S. Security Regulations (i.e., UNCLASSIFIED). If form contains classified information, stamp classification on the top and bottom of the page.

Block 20. Limitation of Abstract. This block must be completed to assign a limitation to the abstract. Enter either UL (unlimited) or SAR (same as report). An entry in this block is necessary if the abstract is to be limited. If blank, the abstract is assumed to be unlimited.

Standard Form 298 Back (Rev. 2-89)

DOCUMENT APPROVAL SHEET

GENCORP AEROJET

TITLE	DOCUMENT NO.
Performance Verification Report Subassembly and Complete Instrument Assembly EOS AMSU-A1 Antenna Drive Subassembly, P/N 1356008-1, S/N 202	Report 11183 July 1998

INPUT FROM:	DATE	CDRL:	SPECIFICATION ENGINEER:	DATE
A. Nieto		208		

CHECKED BY:	DATE	JOB NUMBER:	DATE

APPROVED SIGNATURES	DEPT. NO.	DATE
Engineering (T. Higgins) [signature]	7831	7/14/98
Product Team Leader (A. Nieto) [signature]	8341	7/14/98
Systems Engineer (R. Platt) P. K. Patel	8311	7/14/98
Design Assurance (E. Lorenz) [signature]	8331	7/15/98
Quality Assurance (R. Taylor) [signature] For	7831	7/15/98
Technical Director/PMO (R. Hauerwaas) R V Hauerwaas	4001	7/15/98
Configuration Management (J. Cavanaugh) J. Cavanaugh	8361	7/16/98

By my signature, I certify the above document has been reviewed by me and concurs with the technical requirements related to my area of responsibility.

RELEASE (Data Center) FINAL